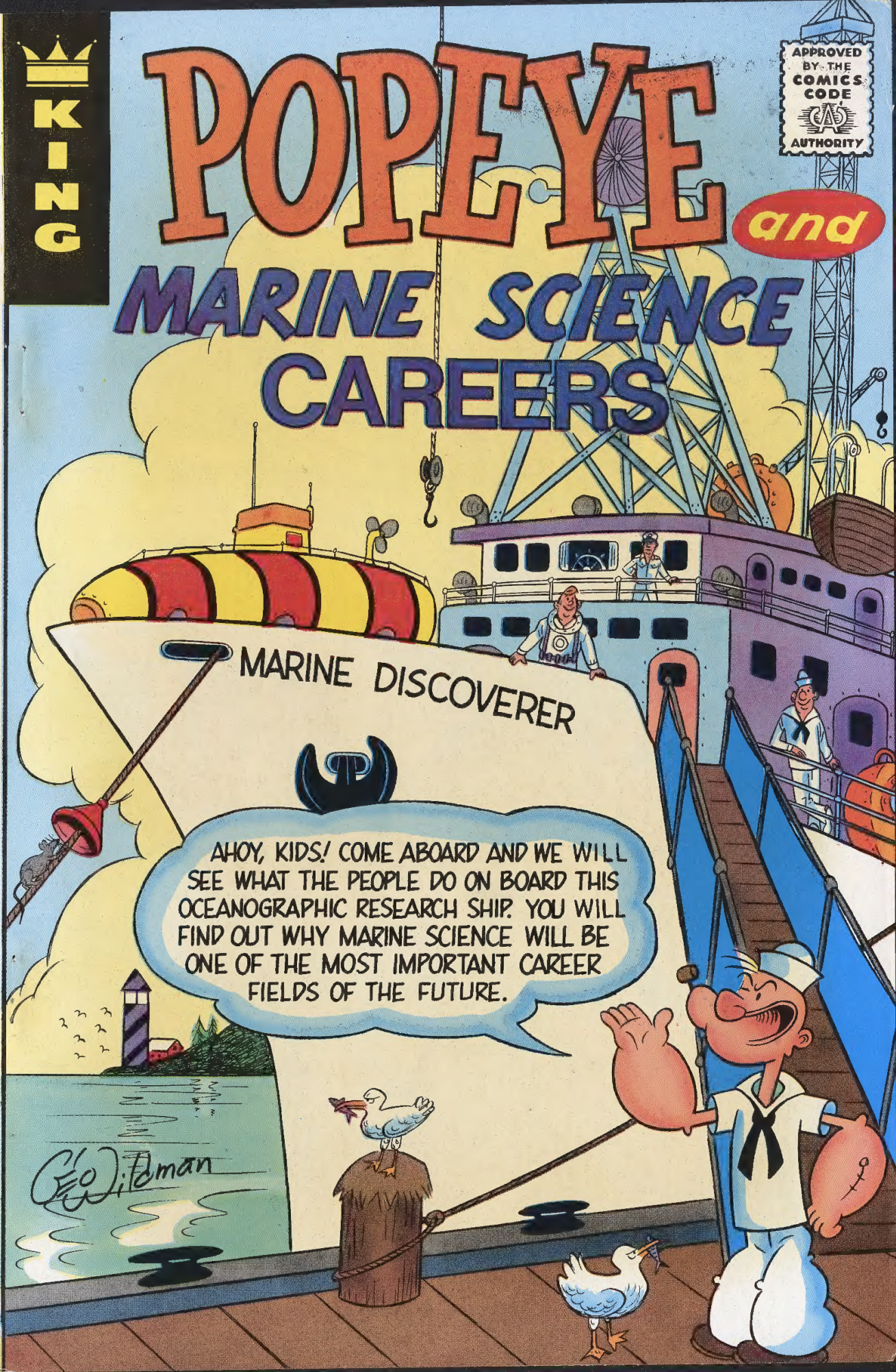
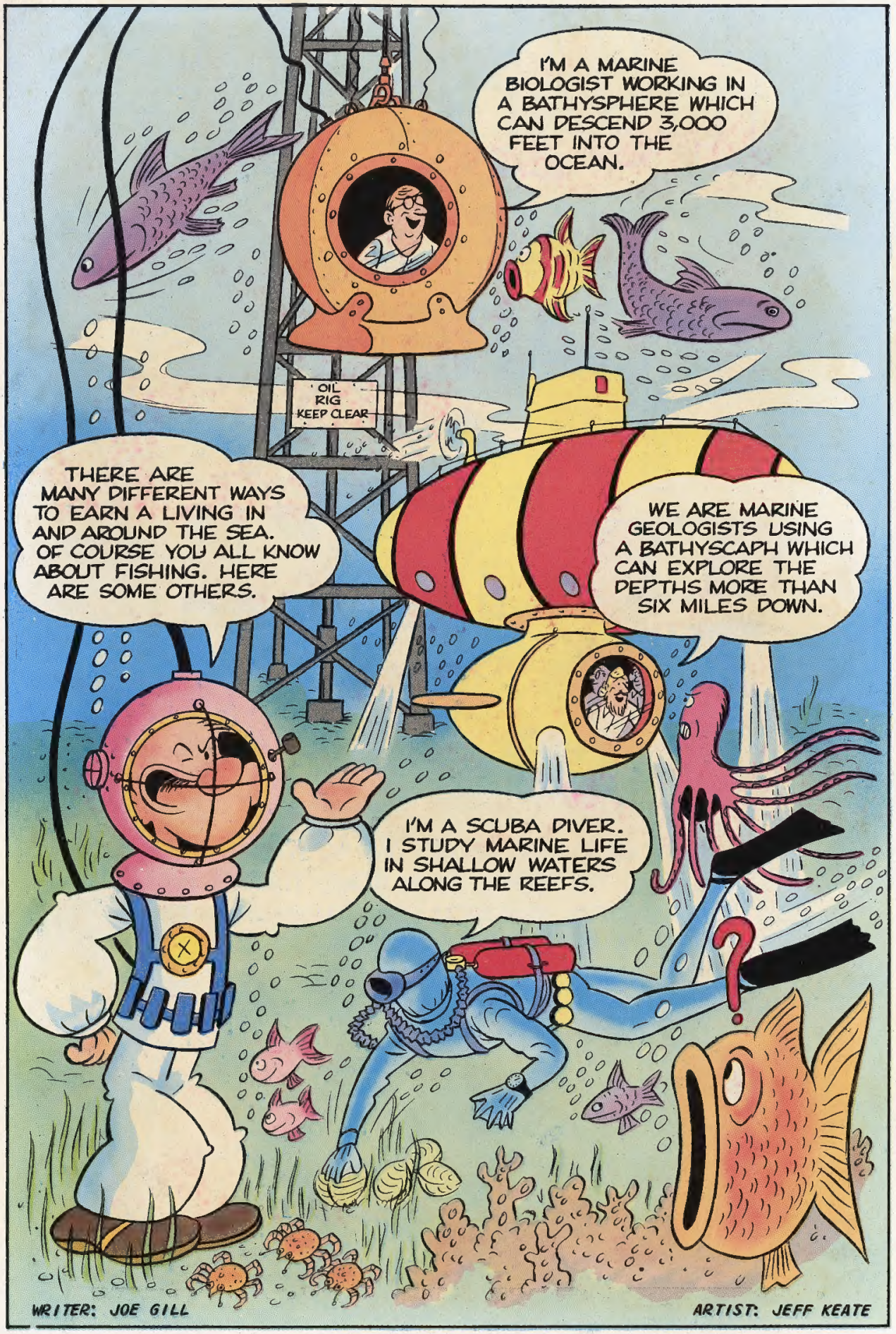
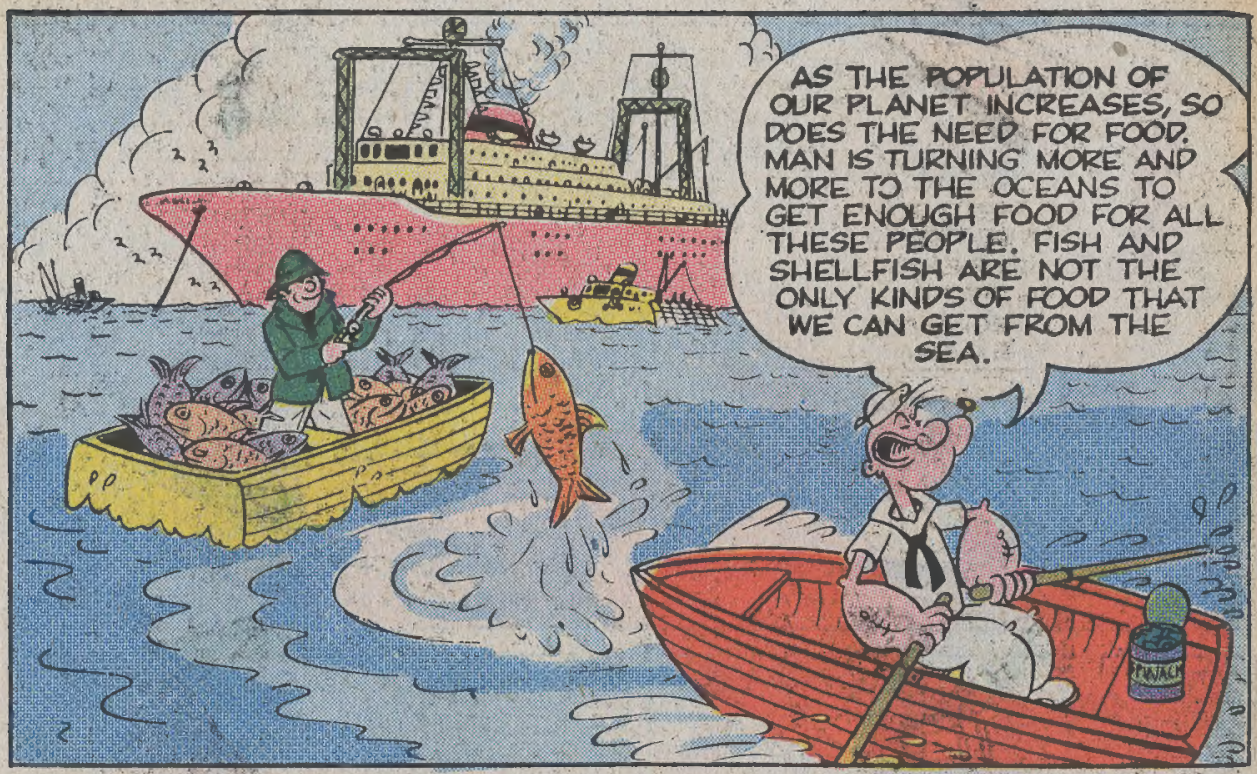
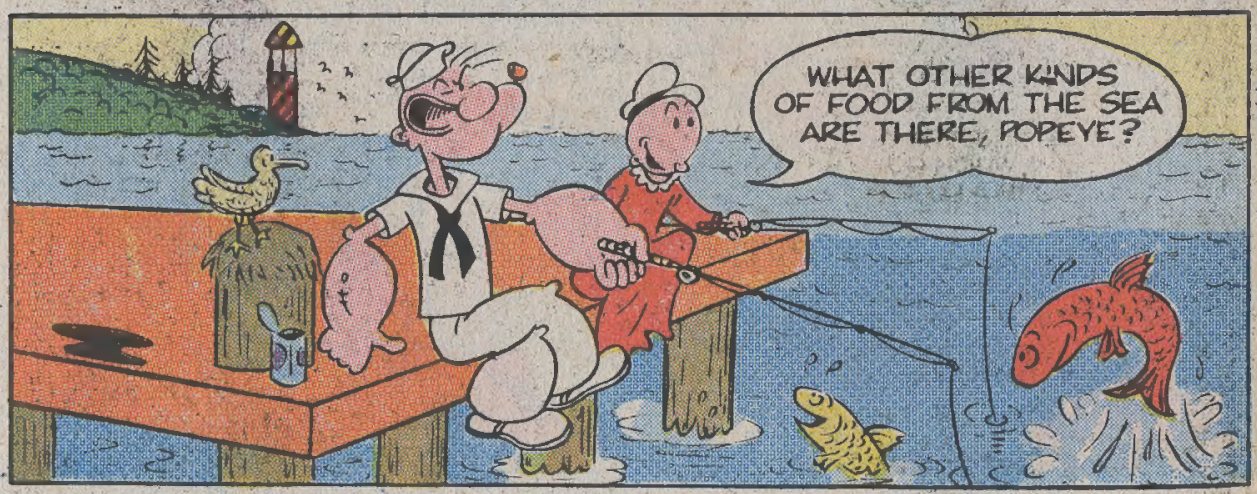
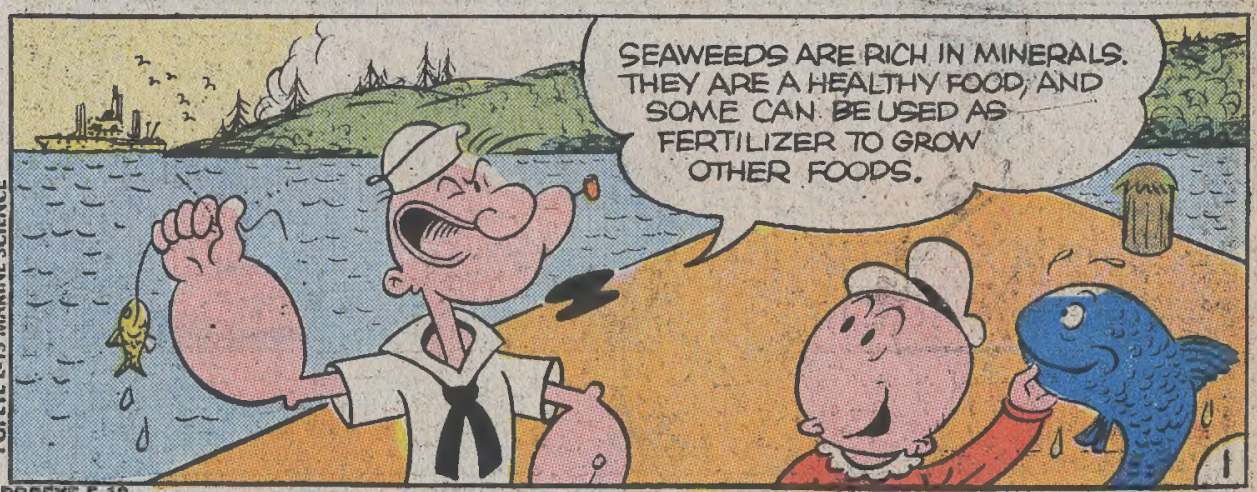

KING
POPEYE and
MARINE SCIENCE CAREERS
APPROVED BY THE COMICS CODE AUTHORITY
MARINE DISCOVERER
AHOY, KIDS! COME ABOARD AND WE WILL SEE WHAT THE PEOPLE DO ON BOARD THIS OCEANOGRAPHIC RESEARCH SHIP. YOU WILL FIND OUT WHY MARINE SCIENCE WILL BE ONE OF THE MOST IMPORTANT CAREER FIELDS OF THE FUTURE.
Geo. Wildman


I'M A MARINE BIOLOGIST WORKING IN A BATHYSPHERE WHICH CAN DESCEND 3,000 FEET INTO THE OCEAN.
OIL RIG KEEP CLEAR
THERE ARE MANY DIFFERENT WAYS TO EARN A LIVING IN AND AROUND THE SEA. OF COURSE YOU ALL KNOW ABOUT FISHING. HERE ARE SOME OTHERS.
WE ARE MARINE GEOLOGISTS USING A BATHYSCAPH WHICH CAN EXPLORE THE DEPTHS MORE THAN SIX MILES DOWN.
I'M A SCUBA DIVER. I STUDY MARINE LIFE IN SHALLOW WATERS ALONG THE REEFS.
?
WRITER: JOE GILL
ARTIST: JEFF KEATE

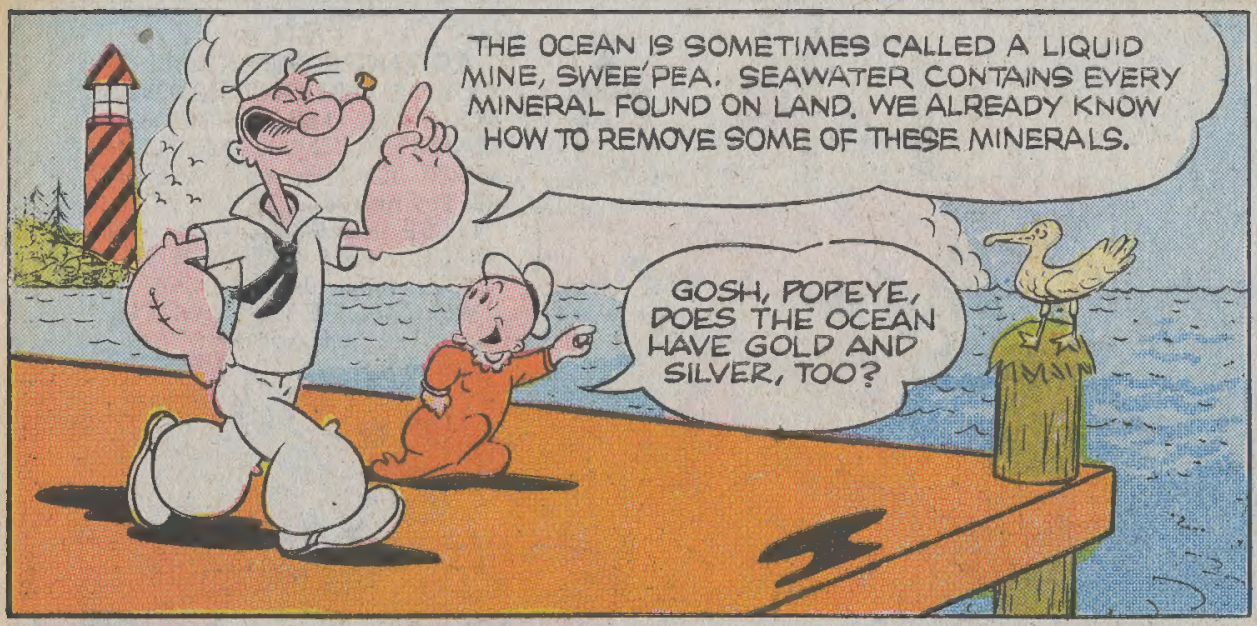


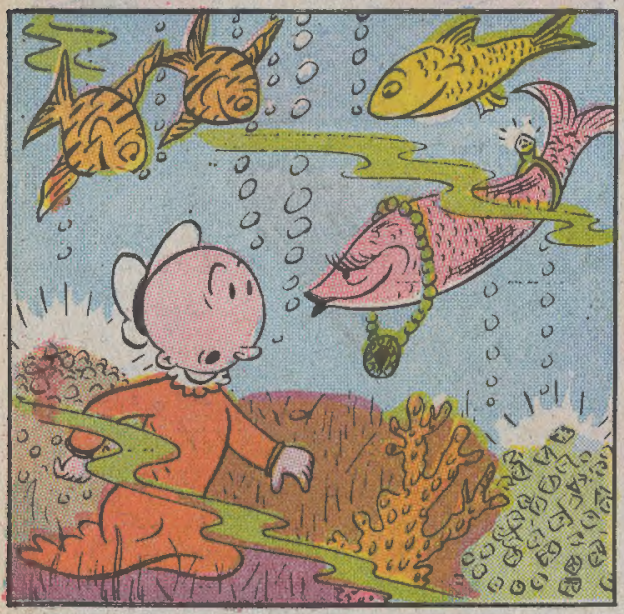


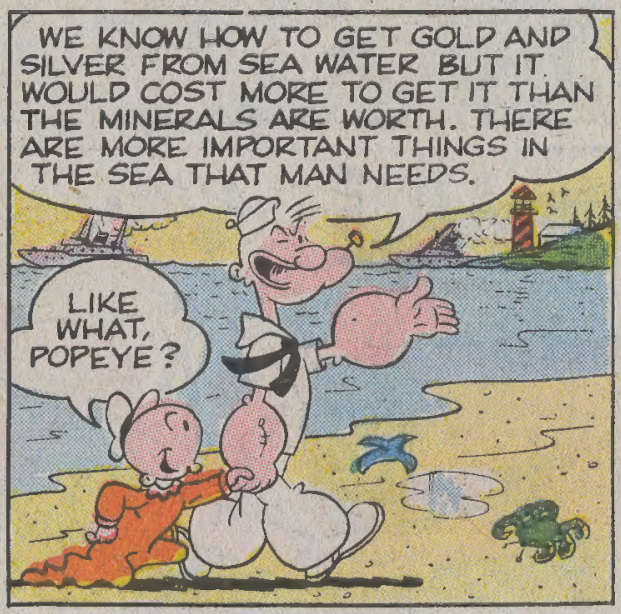


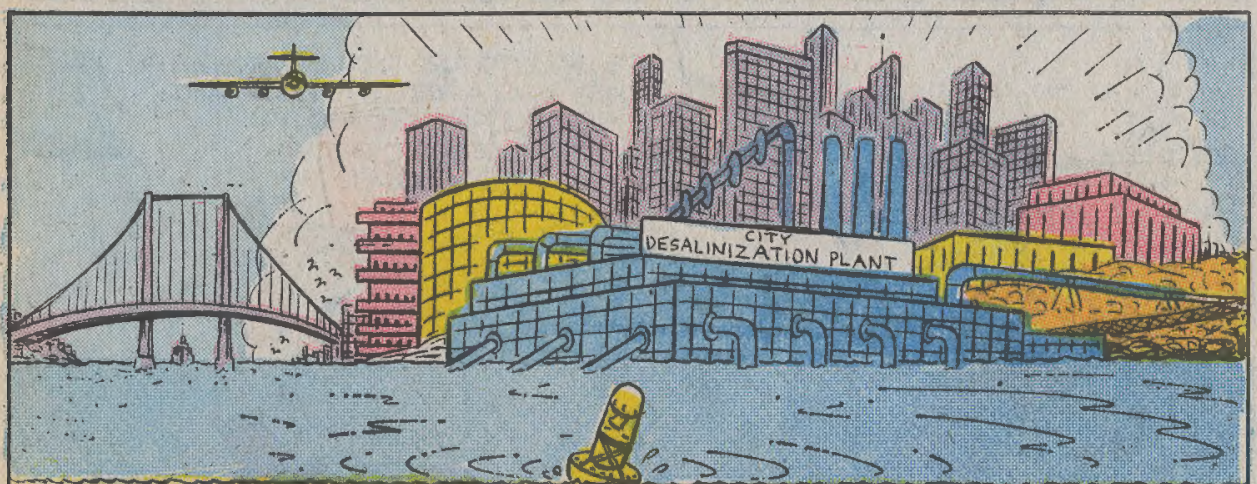
POPEYE E-13 MARINE SCIENCE

POPEYE E-13
published by King Features, 235 E. 45th Street, New York, N.Y. 10017 Printed by Charlton Press, Division Street, Derby, Connecticut, 06418. Canadian Distributor — Edu-Media Ltd. P.O. Box 1240, Kitchener, Ontario N2G 4H1.

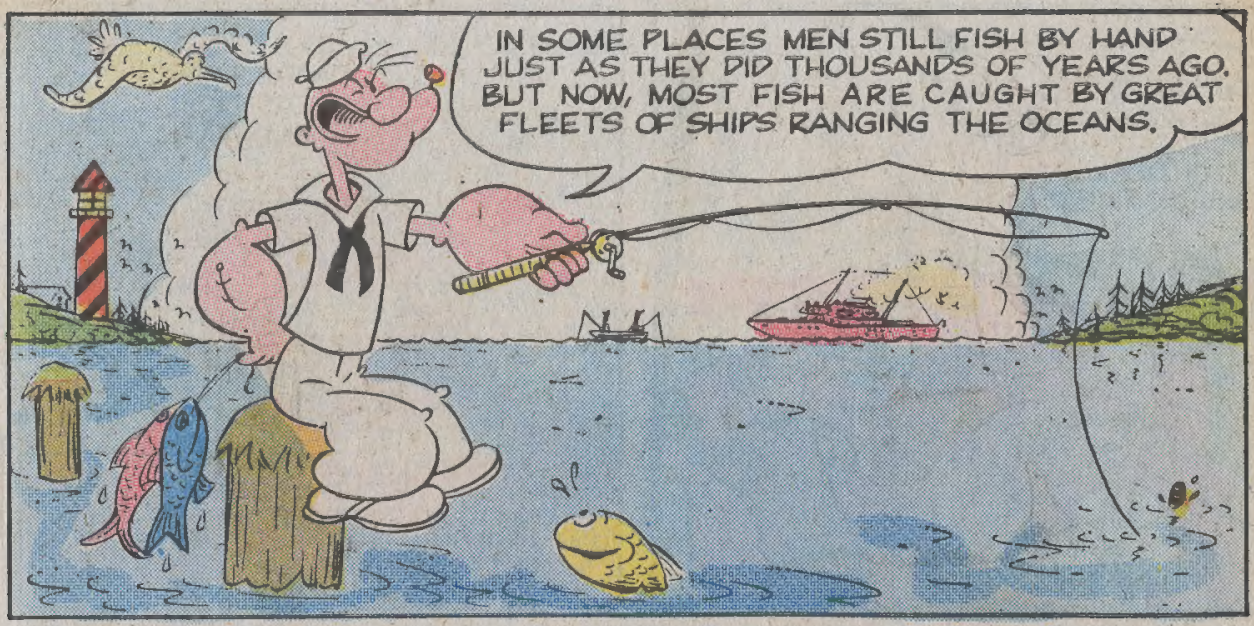


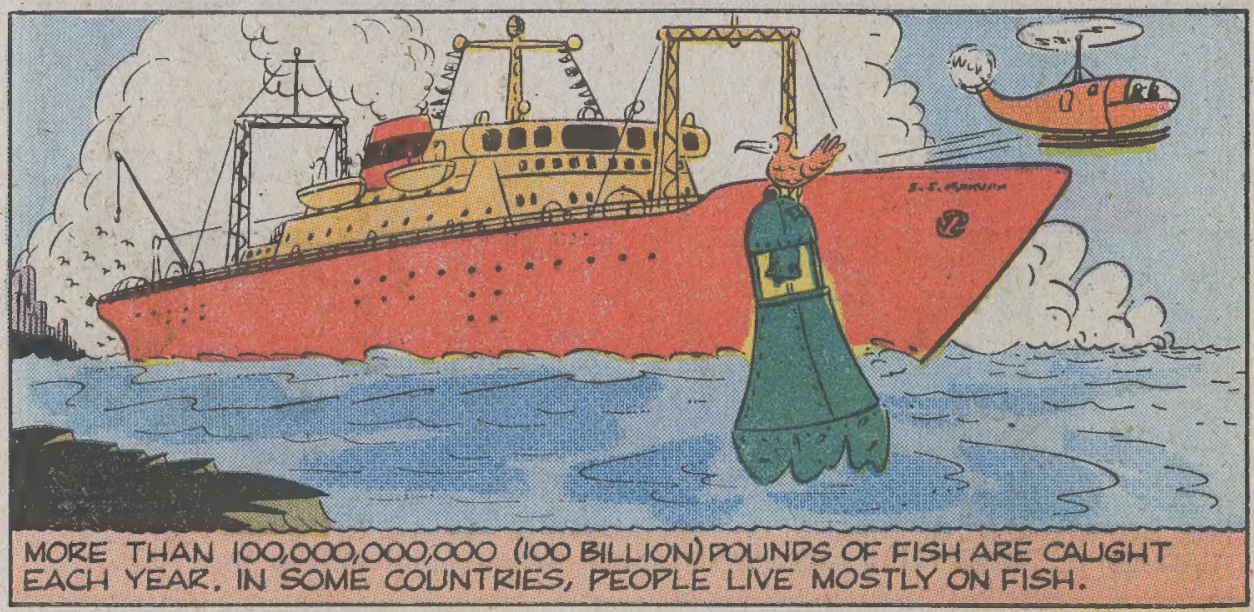




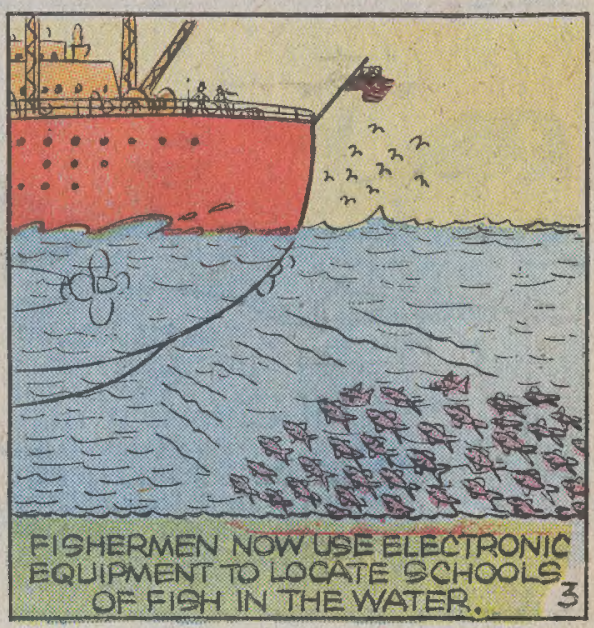


MANY PARTS OF THE WORLD ARE IN NEED OF FRESH WATER. MAN NOW MAKES FRESH WATER FROM SEA WATER BUT SOON HE WILL FIND A CHEAP, EASIER WAY TO MAKE MORE FRESH WATER FOR HOMES, FARMS AND FACTORIES.

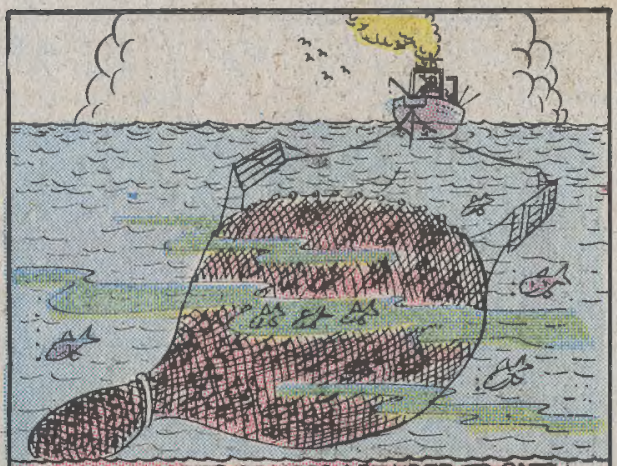




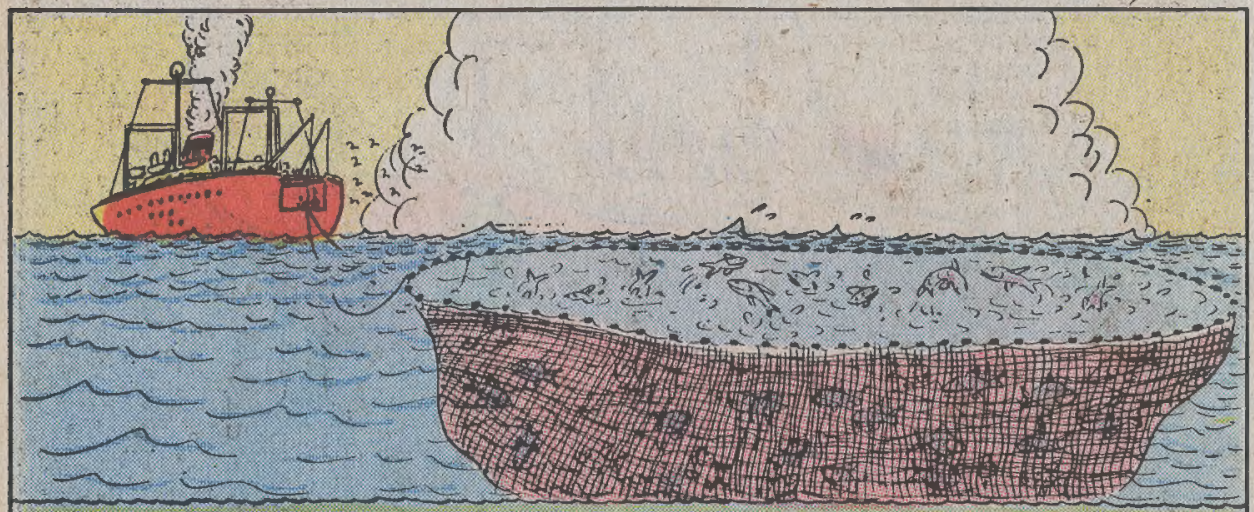
MORE THAN 100,000,000,000 (100 BILLION) POUNDS OF FISH ARE CAUGHT EACH YEAR. IN SOME COUNTRIES, PEOPLE LIVE MOSTLY ON FISH.



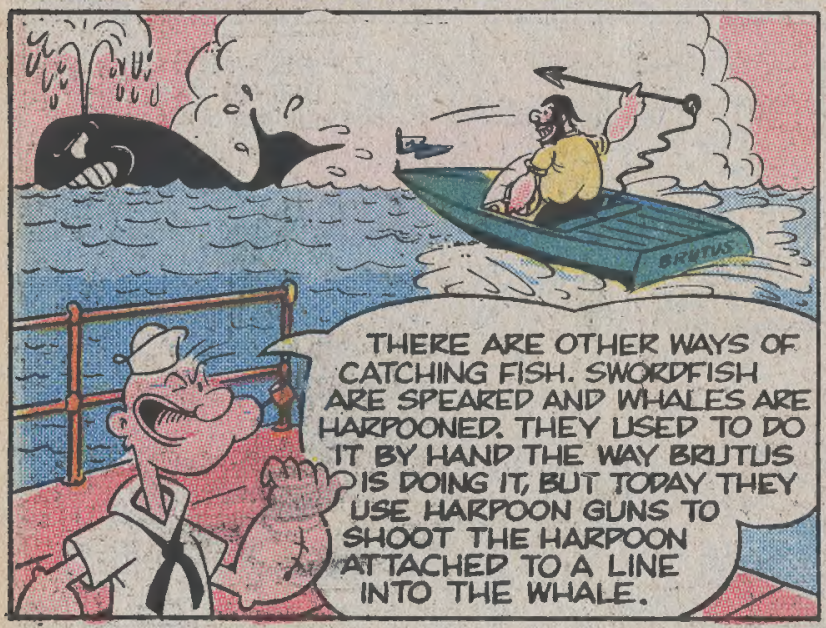
FISHERMEN NOW USE ELECTRONIC EQUIPMENT TO LOCATE SCHOOLS OF FISH IN THE WATER.

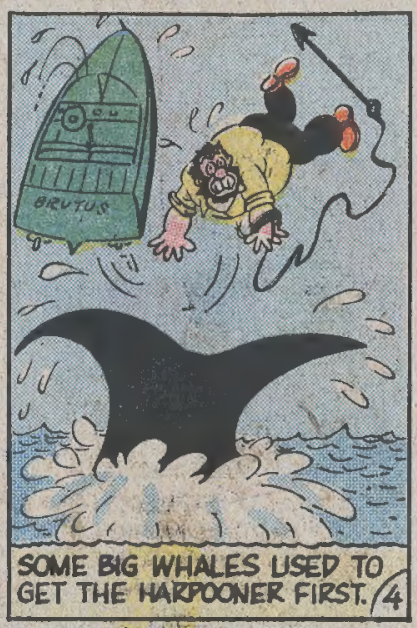


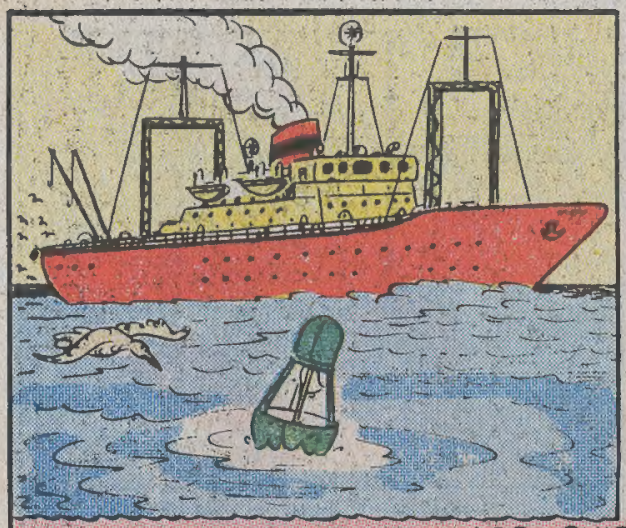
DIFFERENT TYPES OF NETS ARE USED TO CATCH DIFFERENT FISH. THIS NET CATCHES SHRIMP, CRAB, FLOUNDER AND OTHER BOTTOM FISH. THE BOAT'S FORWARD SPEED KEEPS THE FRONT OF THE NET OPEN UNTIL IT IS FULL. THEN IT IS PULLED CLOSED.

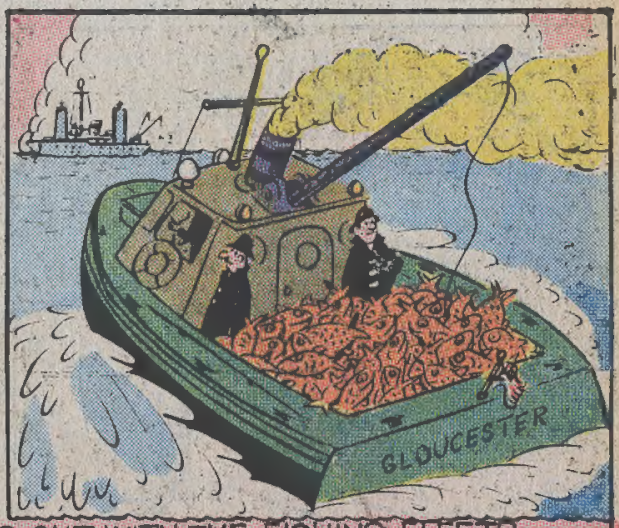


THE BOTTOM PART OF THIS NET CAN BE CLOSED BY PULLING THE CABLE RUNNING THROUGH IT. THESE NETS ARE USED TO CATCH SALMON, MACKERAL AND TUNA.

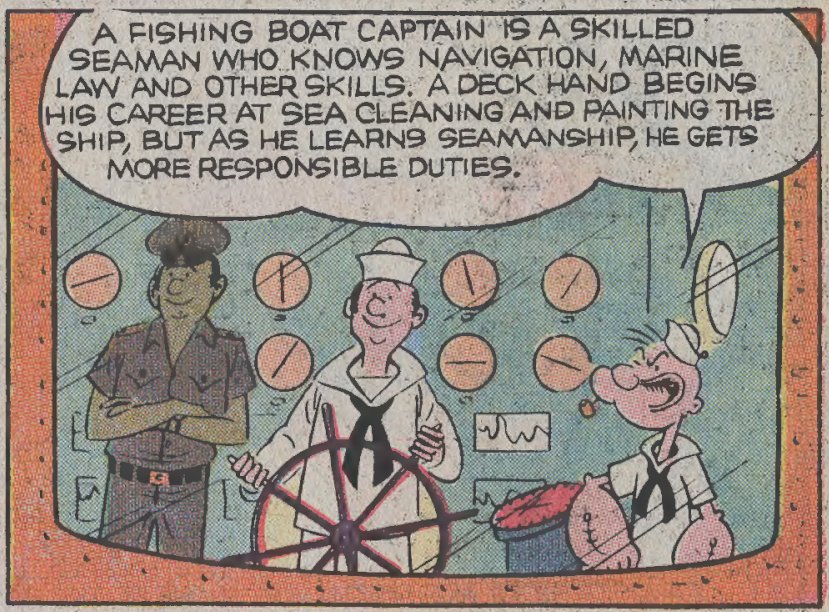


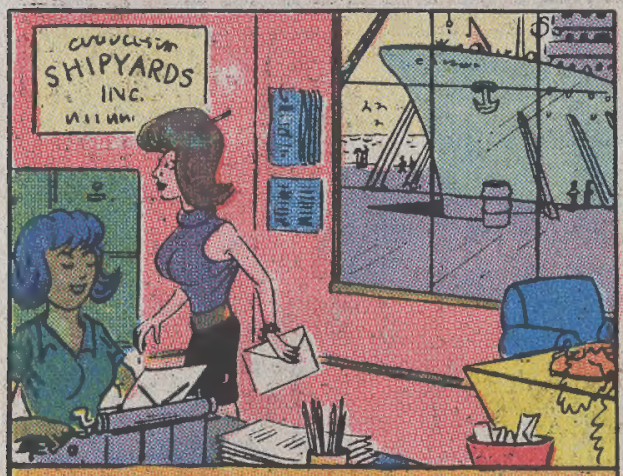




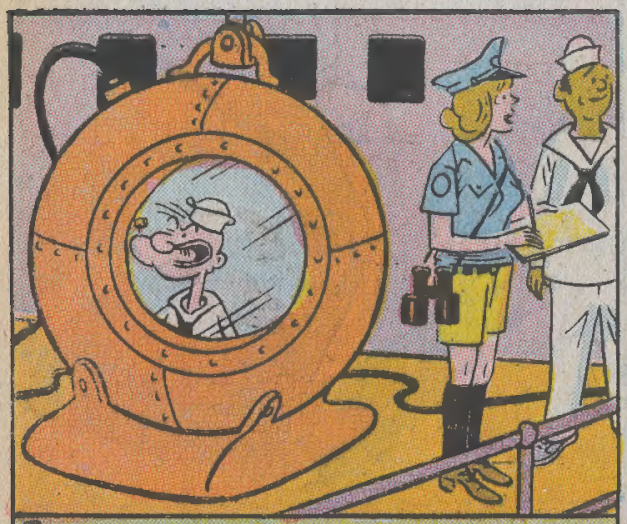


SOME NATIONS SEND VERY LARGE SHIPS OUT WITH THE FISHING FLEETS. THEY ARE EQUIPPED AS FLOATING CANNERIES. THE FISH ARE CLEANED, COOKED AND CANNED RIGHT AFTER THEY'RE CAUGHT.

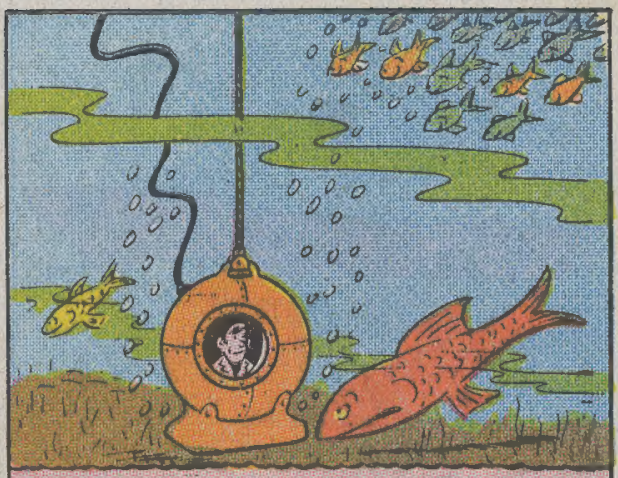




THOUSANDS OF PEOPLE ON SHORE WORK TO SUPPORT THE WORKERS AT SEA. THEY WORK IN SHIPYARDS, SHIP COMPANY OFFICES AND IN CANNERIES. FISH STORES SELL THE FISH TO CUSTOMERS.

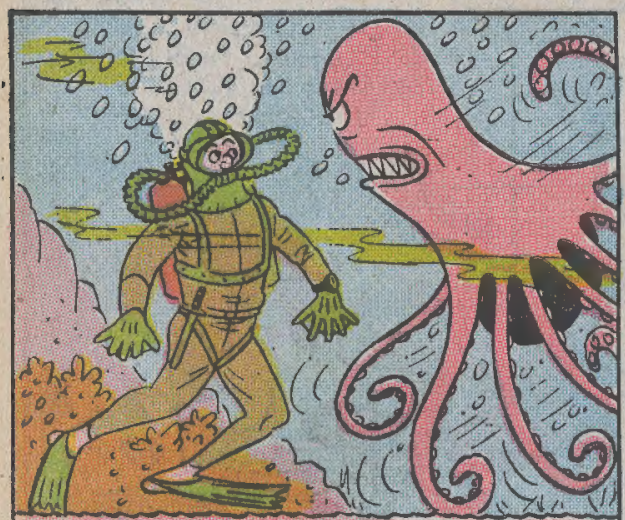


OCEANOGRAPHERS MAKE SCIENTIFIC STUDIES OF THE OCEAN'S MOVEMENTS, PROPERTIES, AND PLANT AND ANIMAL LIFE.



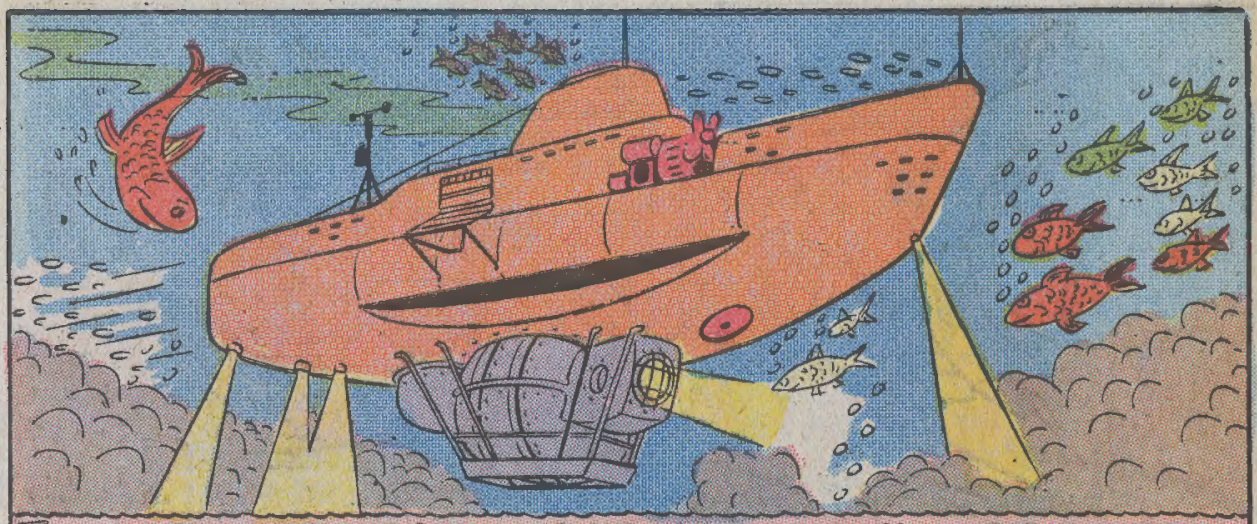
OCEANOGRAPHERS MAKE DEEP-WATER STUDIES OF MARINE LIFE FROM THE WINDOWS OF THEIR BATHYSPHERE, OR DIVING BELL.

MOST OCEANOGRAPHERS ARE SPECIALISTS IN ONE OF THE BRANCHES OF THE PROFESSION.

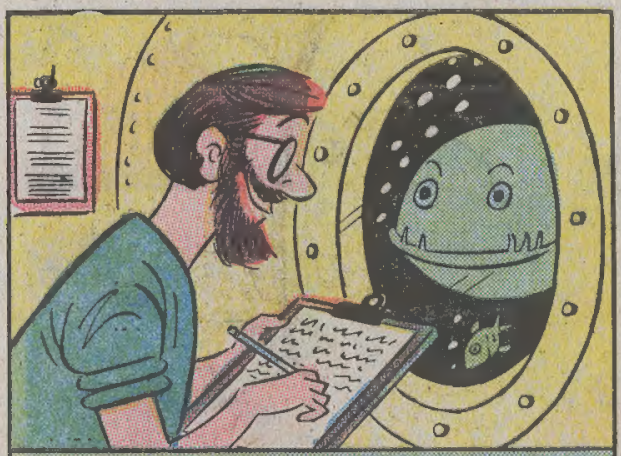


BIOLOGICAL OCEANOGRAPHERS STUDY MARINE LIFE AND THE ENVIRONMENTAL CONDITIONS AFFECTING IT.

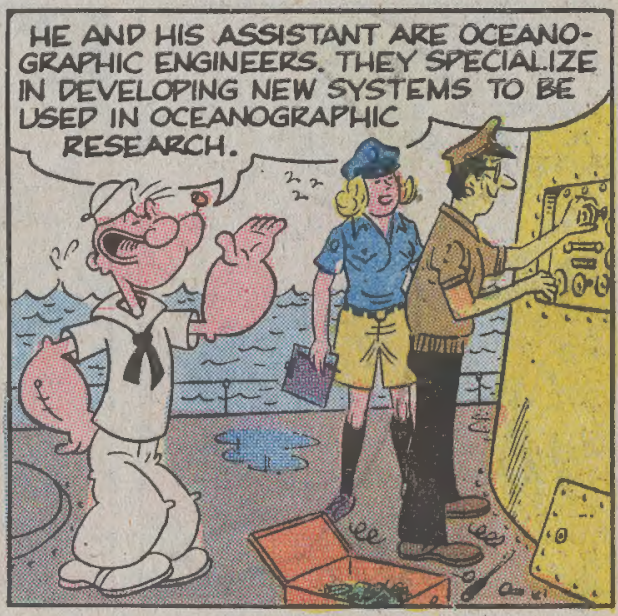
BIOLOGICAL OCEANOGRAPHERS HAVE BEEN HELPFUL TO THE FISHING INDUSTRY. WHEN SOME KINDS OF FISH OR SHELLFISH BECOME SCARCE THEY TRY TO LEARN WHY.

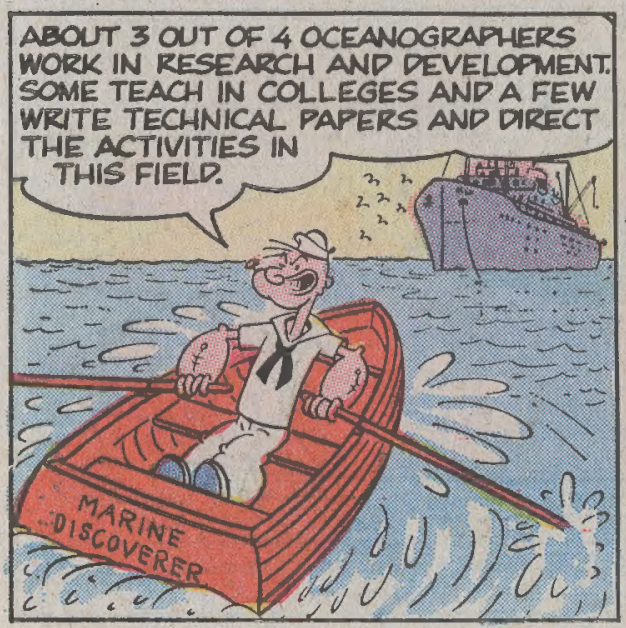


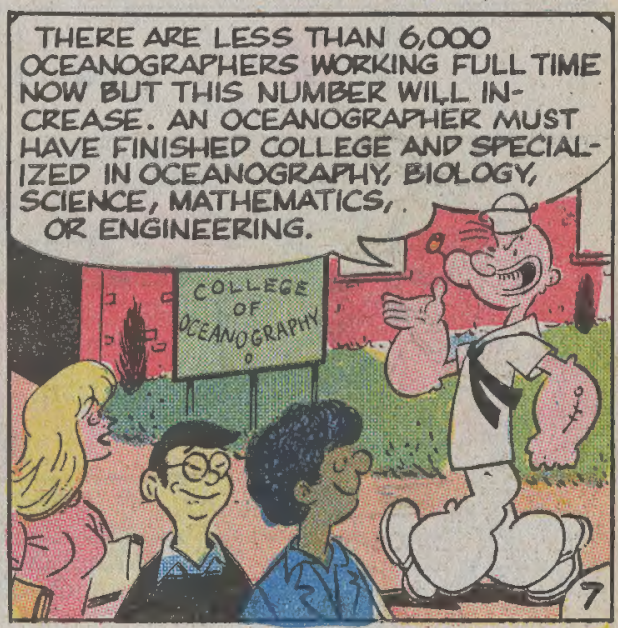
THIS IS A BATHYSCAPH, OR SCIENTIFIC SUBMARINE, WHICH CAN DESCEND MORE THAN 30,000 FEET INTO THE OCEAN. IN IT, PHYSICAL OCEANOGRAPHERS STUDY THE OCEAN'S PHYSICAL FEATURES, TEMPERATURE, TIDES AND CURRENTS.

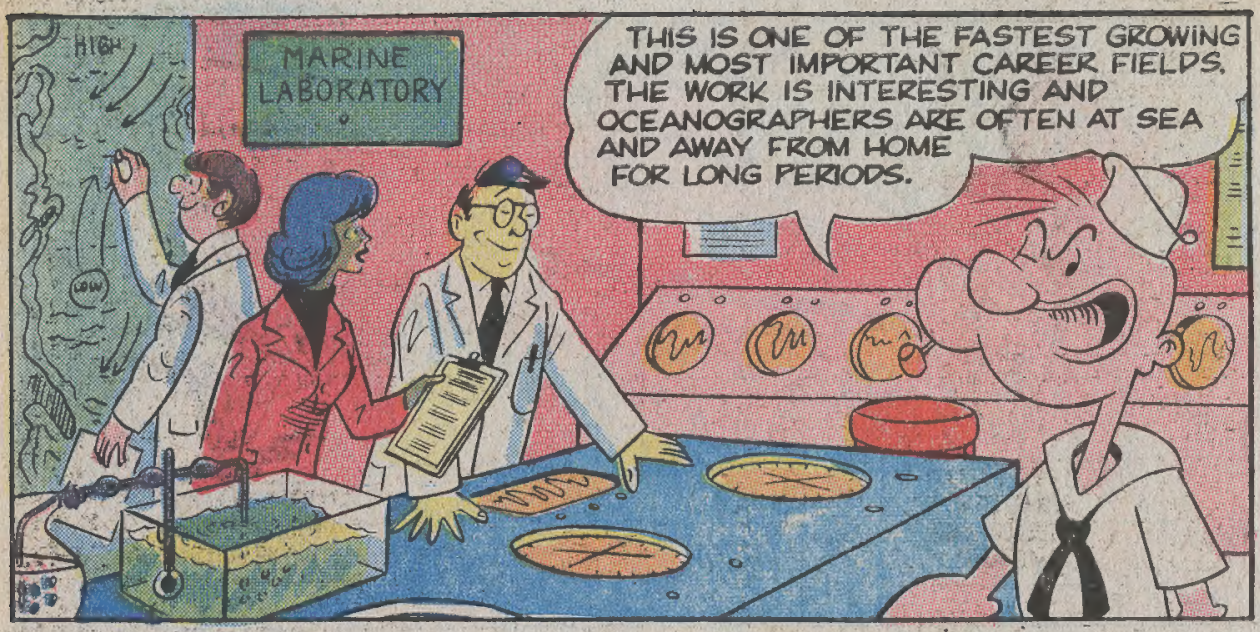


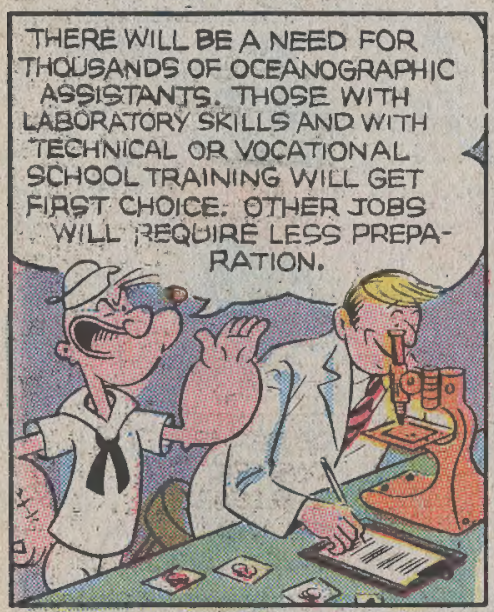
GEOLOGICAL OCEANOGRAPHERS ALSO USE THE BATHYSCAPH TO STUDY ROCK AND DIRT LAYERS ON THE OCEAN FLOOR. CHEMICAL OCEANOGRAPHERS STUDY THE CHEMICAL MAKEUP OF THE WATER AND CHEMICAL REACTIONS THAT OCCUR.

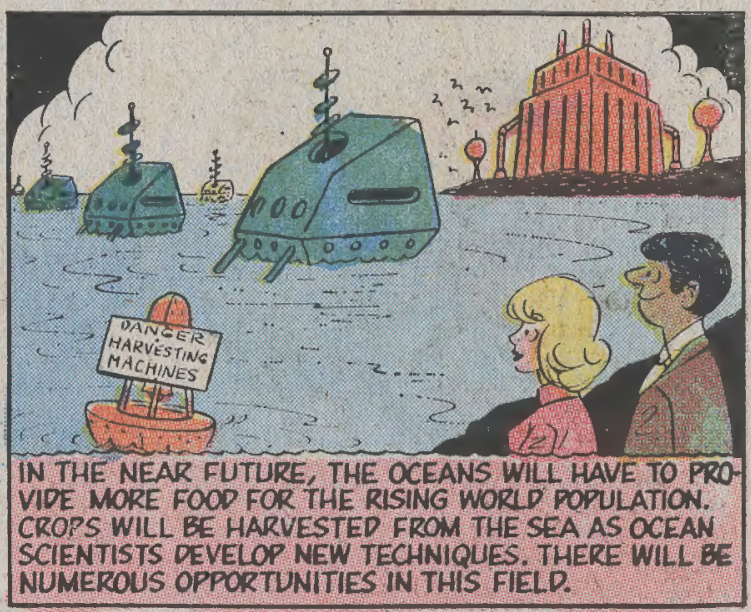


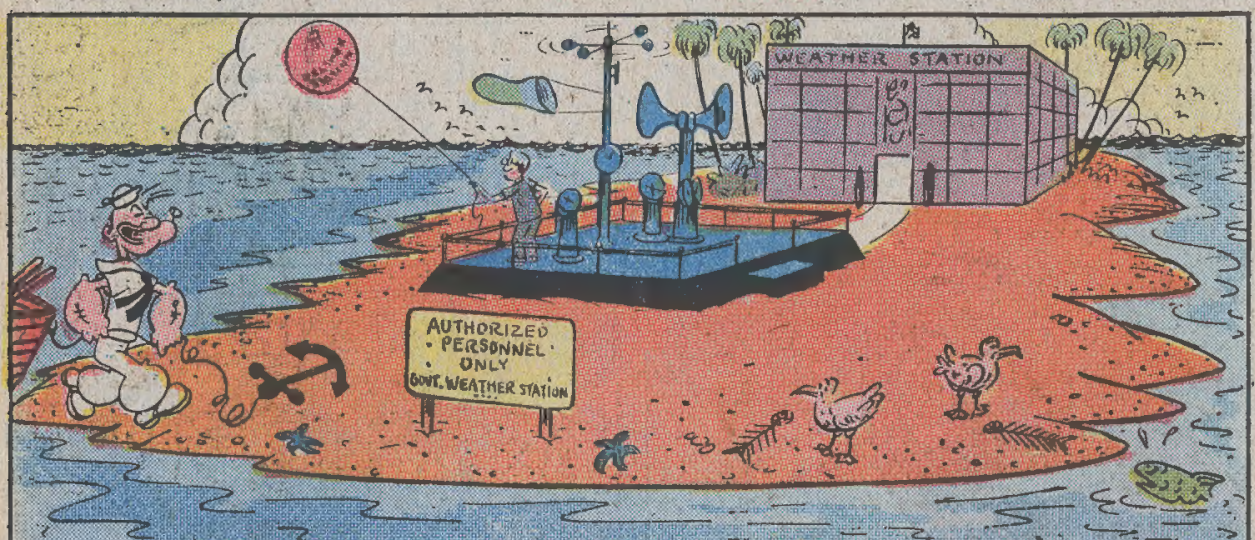


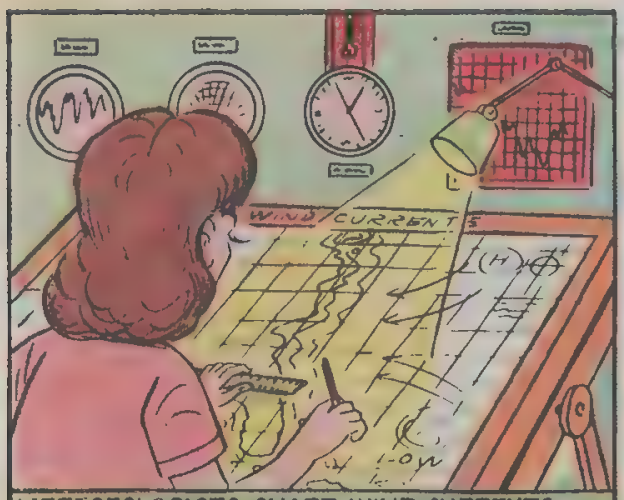



HIGH
LOW
MARINE LABORATORY
THIS IS ONE OF THE FASTEST GROWING AND MOST IMPORTANT CAREER FIELDS. THE WORK IS INTERESTING AND OCEANOGRAPHERS ARE OFTEN AT SEA AND AWAY FROM HOME FOR LONG PERIODS.


THERE WILL BE A NEED FOR THOUSANDS OF OCEANOGRAPHIC ASSISTANTS. THOSE WITH LABORATORY SKILLS AND WITH TECHNICAL OR VOCATIONAL SCHOOL TRAINING WILL GET FIRST CHOICE. OTHER JOBS WILL REQUIRE LESS PREPARATION.

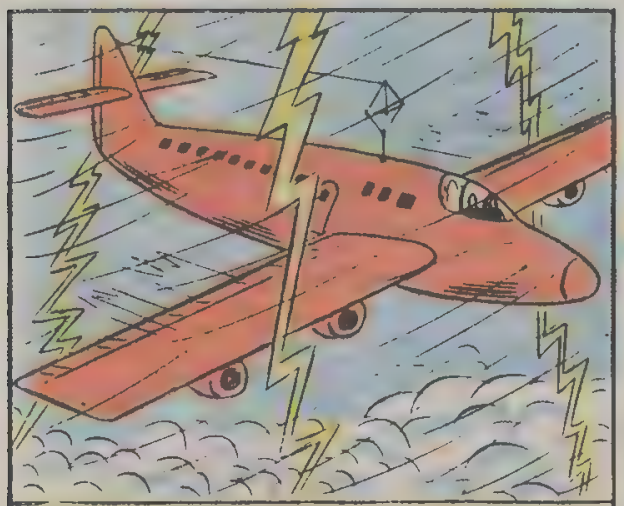

DANGER HARVESTING MACHINES
IN THE NEAR FUTURE, THE OCEANS WILL HAVE TO PROVIDE MORE FOOD FOR THE RISING WORLD POPULATION. CROPS WILL BE HARVESTED FROM THE SEA AS OCEAN SCIENTISTS DEVELOP NEW TECHNIQUES. THERE WILL BE NUMEROUS OPPORTUNITIES IN THIS FIELD.


WEATHER STATION
AUTHORIZED PERSONNEL ONLY
GOVT. WEATHER STATION
METEOROLOGISTS STUDY THE INTERACTION OF THE ATMOSPHERE AND THE OCEAN. THEY ALSO STUDY WIND CURRENTS, OCEAN CURRENTS AND SEAWATER TEMPERATURE.

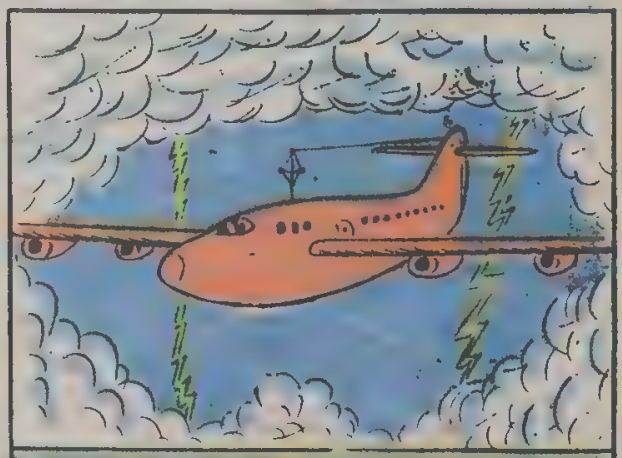


METEOROLOGISTS CHART WIND CURRENTS, MEASURE BAROMETRIC PRESSURES, OBSERVE WEATHER PATTERNS, AND THEY OFTEN PREDICT ONCOMING STORMS AND WEATHER CHANGES.

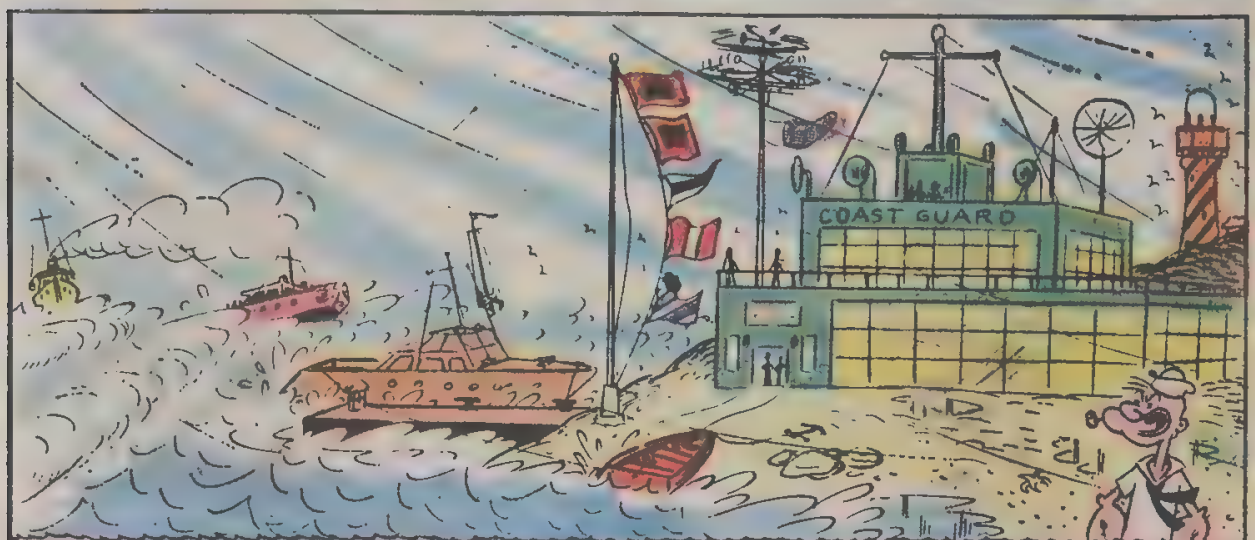
WHEN A TROPICAL STORM IS LOCATED, A SCIENTIFICALLY EQUIPPED AIRPLANE CARRIES METEOROLOGISTS INTO THE STORM AREA.



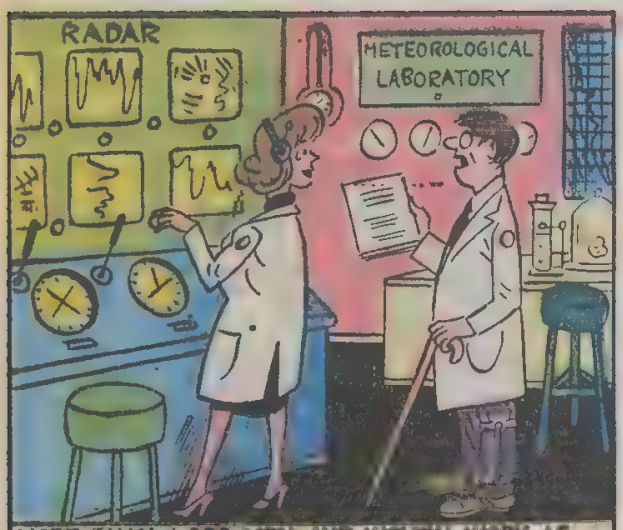
THE AREA OF THE STORM IS MEASURED, AS WELL AS ITS DIRECTION AND SPEED. THIS INFORMATION IS RADIOED BACK TO METEOROLOGISTS ON SHORE.



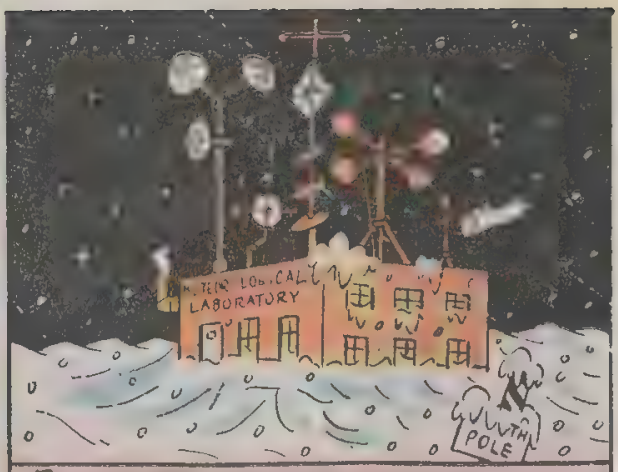
WHEN THE EYE, OR CENTER OF THE STORM IS FOUND, MORE BAROMETRIC READINGS ARE MADE AND MORE IS LEARNED ABOUT THE STORM'S CAUSE AND INTENSITY.



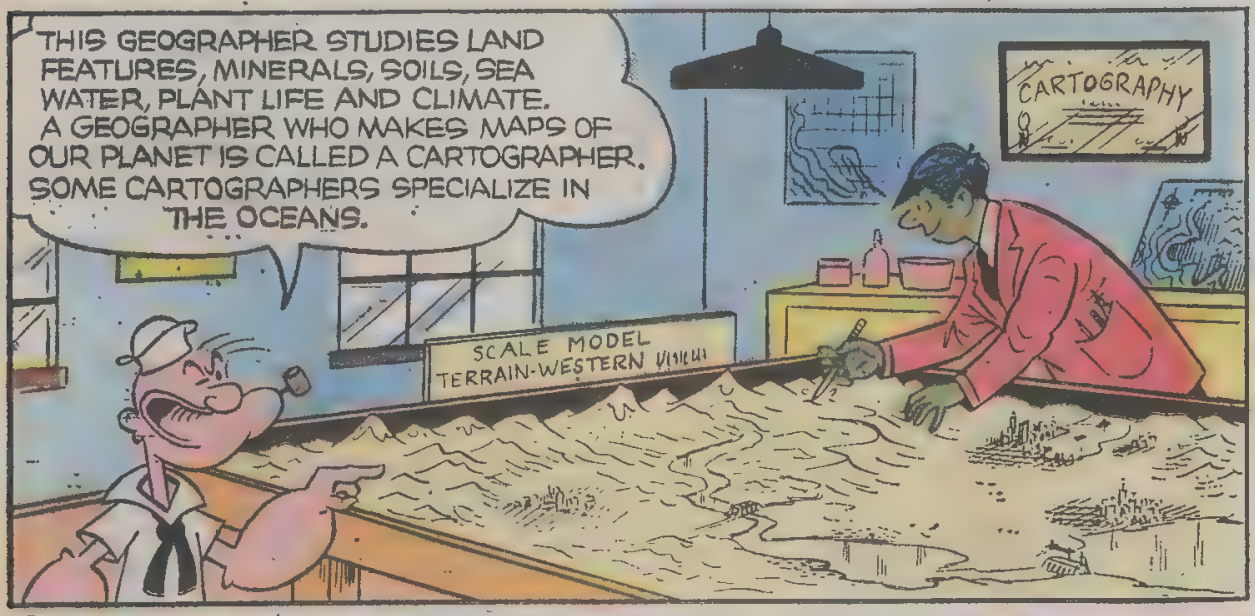
BOATMEN AND PEOPLE ALONG THE COAST WHO MAY BE IN DANGER FROM THE STORM ARE WARNED SO THEY CAN GET READY FOR THE COMING STORM.

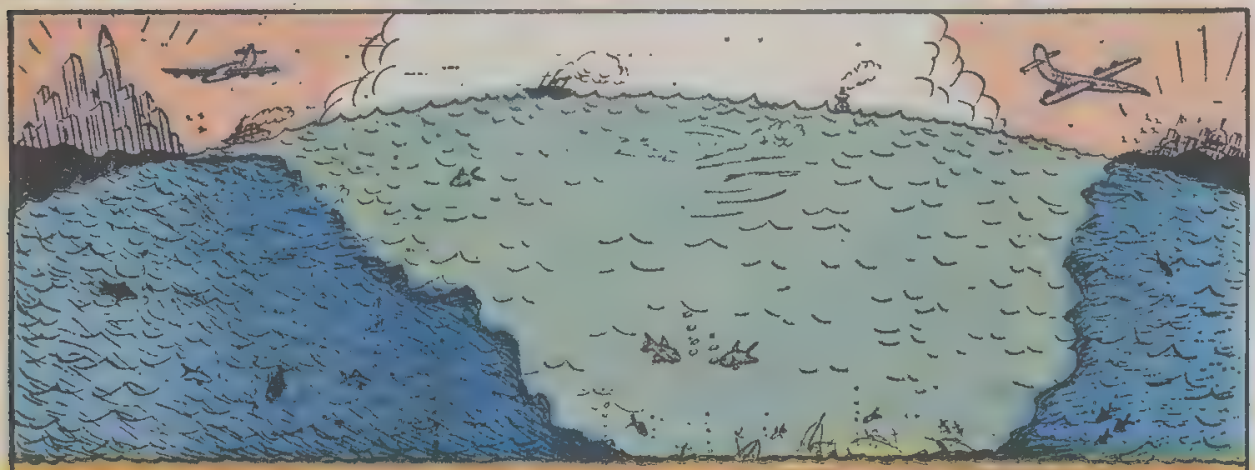


MORE THAN 4,000 MEN AND WOMEN WORK AS METEOROLOGISTS. THEY WORK ALL OVER THE WORLD, SOME IN VERY FARAWAY PLACES.



A METEOROLOGIST NEEDS TO BE A COLLEGE GRADUATE WITH A MAJOR IN METEOROLOGY. THERE ARE ASSISTANT'S JOBS FOR HIGH SCHOOL GRADUATES WITH ON-THE-JOB OR SPECIAL TRAINING.

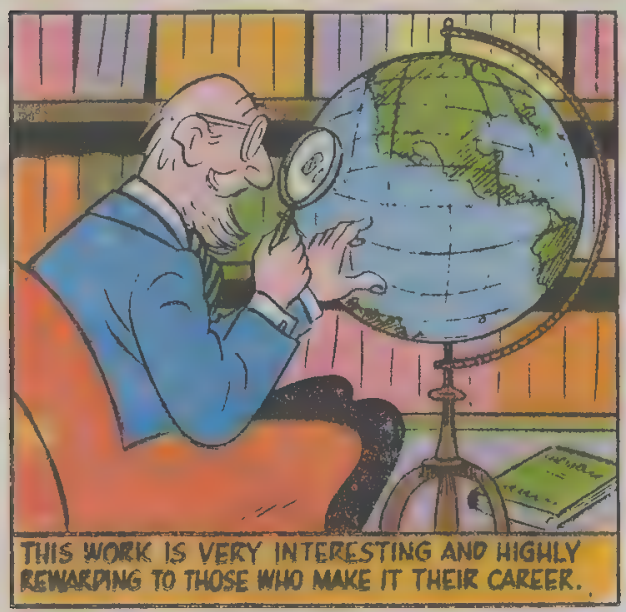




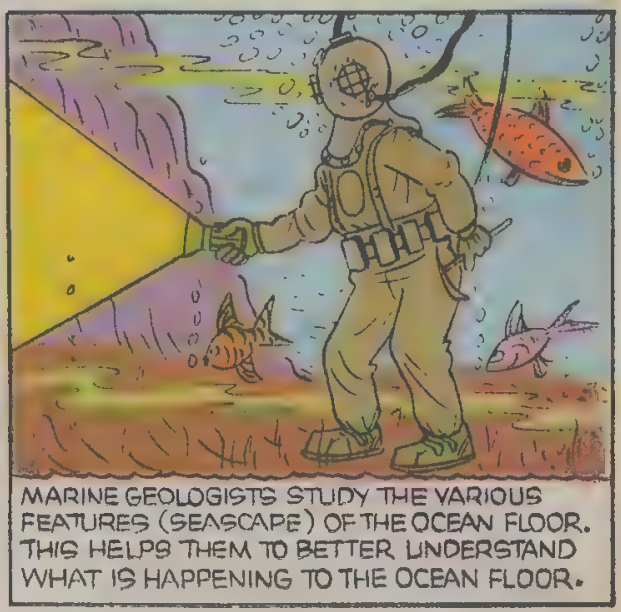
THE CARTOGRAPHERS HAVE MAPPED THE OCEANS WITH THE INFORMATION NOW AVAILABLE. THEY THINK NOW THAT THE DEEPEST PLACE IN THE OCEAN IS CHALLENGER DEEP, NEAR THE ISLAND OF GUAM IN THE PACIFIC. IT IS 36,198 FEET, OR ABOUT 7 MILES, DEEP THERE. THEY HAVE MADE MAPS OF OUR OCEAN FLOORS ALMOST AS ACCURATE AS THOSE WE HAVE OF LAND AREAS.

OCEANIC GEOGRAPHERS OBSERVE THE ACTION OF TIDES, WAVES AND CURRENTS. THEY STUDY THE CHANGES IN THE OCEAN BOTTOM AND THE SHORE.

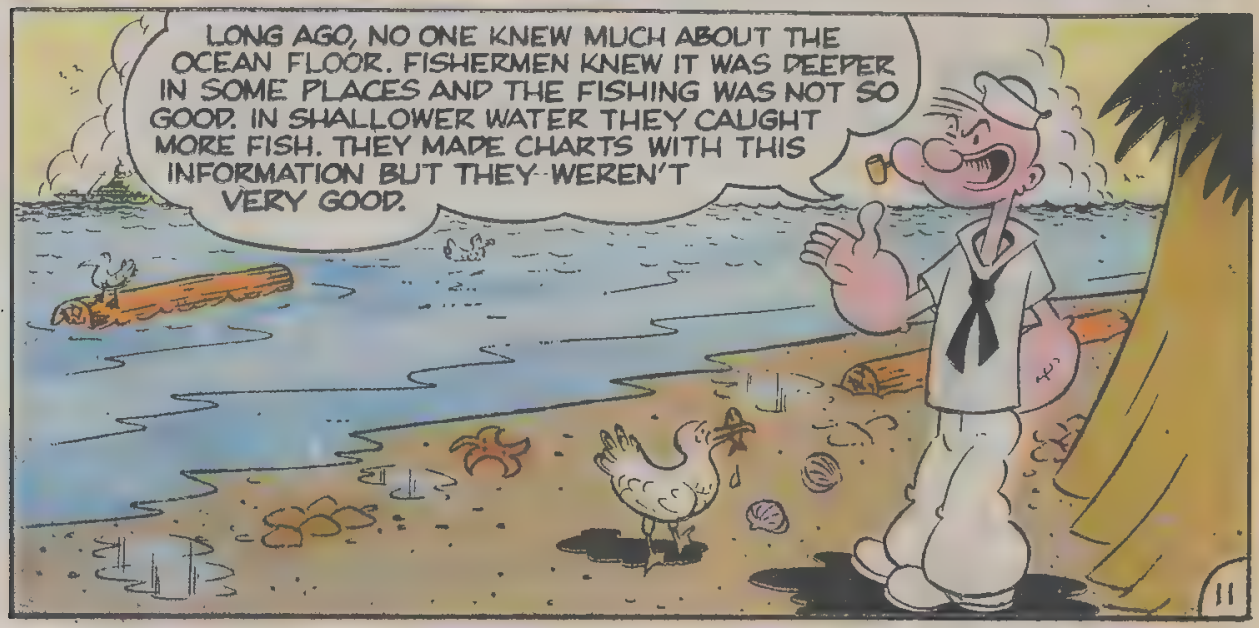
MOST CARTOGRAPHERS WORK FOR GOVERNMENT AGENCIES OR IN UNIVERSITIES. THERE ARE LESS THAN 5,000 GEOGRAPHERS EMPLOYED. ONLY SOME OF THEM SPECIALIZE IN CARTOGRAPHY. A COLLEGE DEGREE WITH A MAJOR IN GEOGRAPHY IS REQUIRED TO ENTER THIS FIELD.

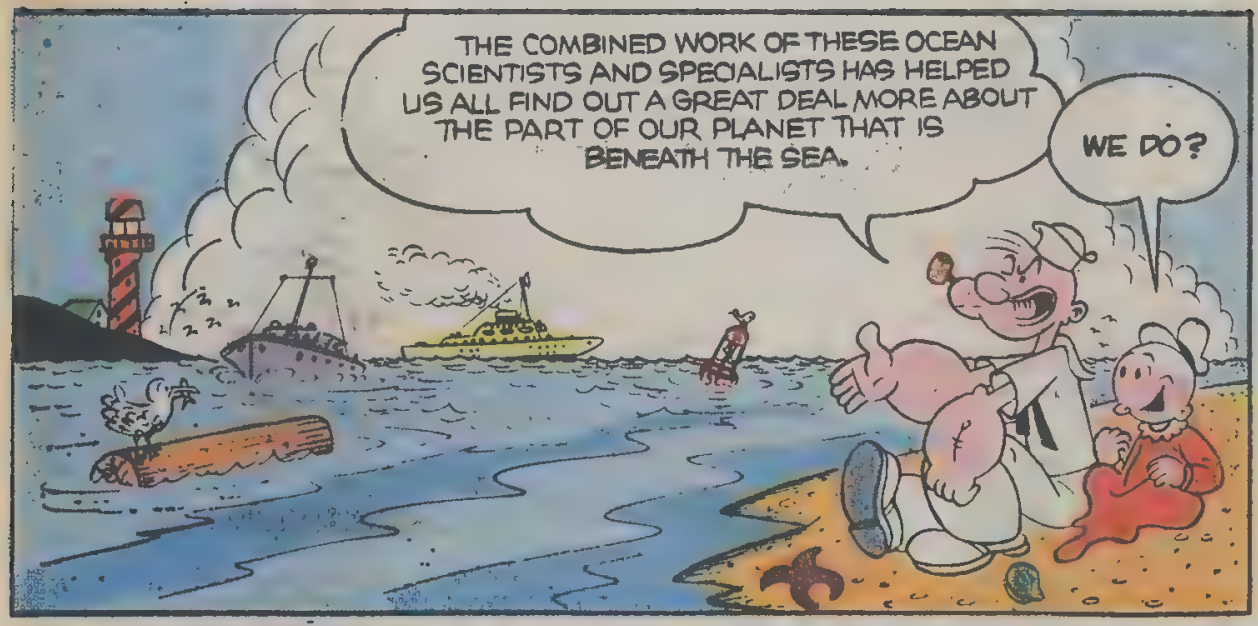


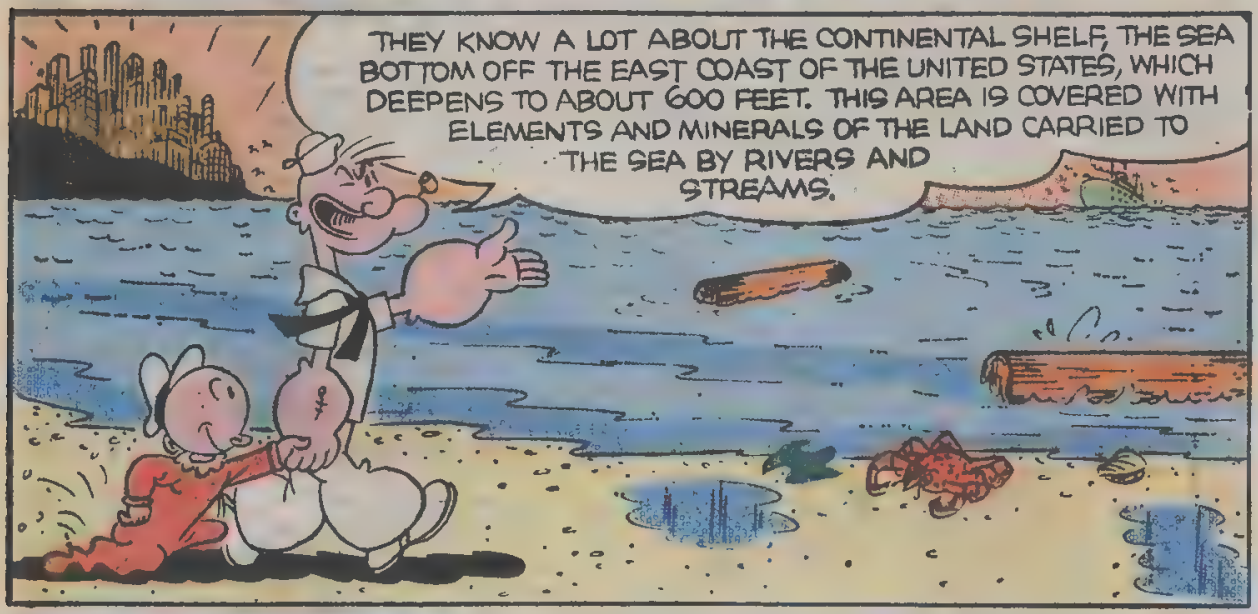
THIS WORK IS VERY INTERESTING AND HIGHLY REWARDING TO THOSE WHO MAKE IT THEIR CAREER.

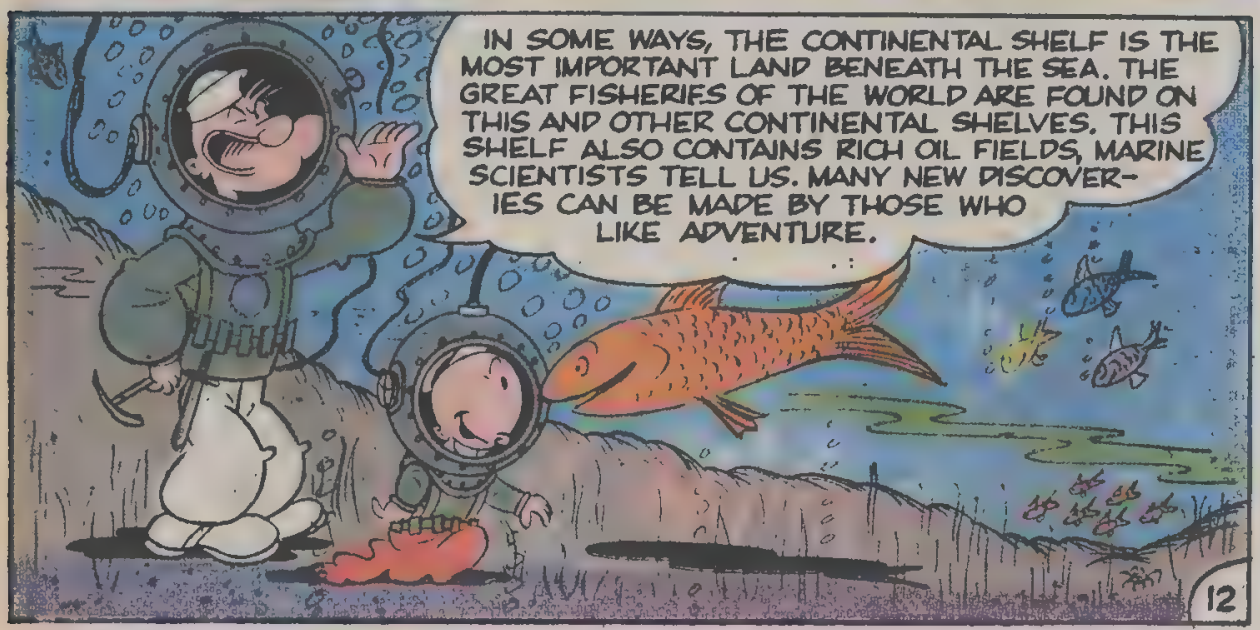


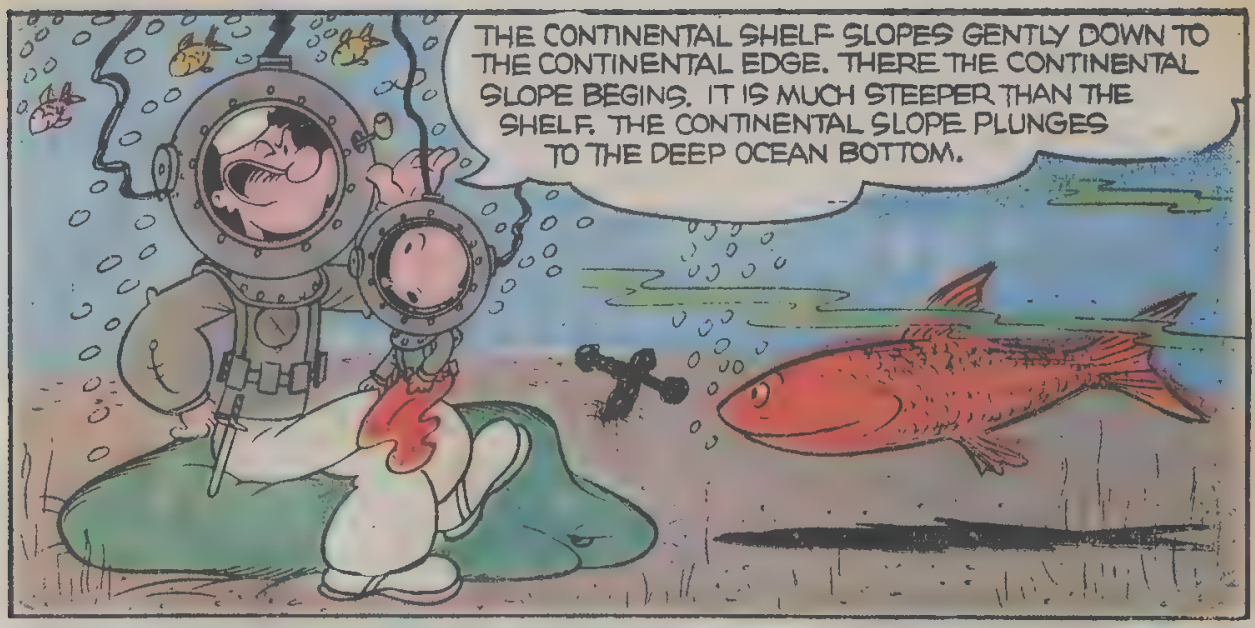
MARINE GEOLOGISTS STUDY THE VARIOUS FEATURES (SEASCAPE) OF THE OCEAN FLOOR. THIS HELPS THEM TO BETTER UNDERSTAND WHAT IS HAPPENING TO THE OCEAN FLOOR.

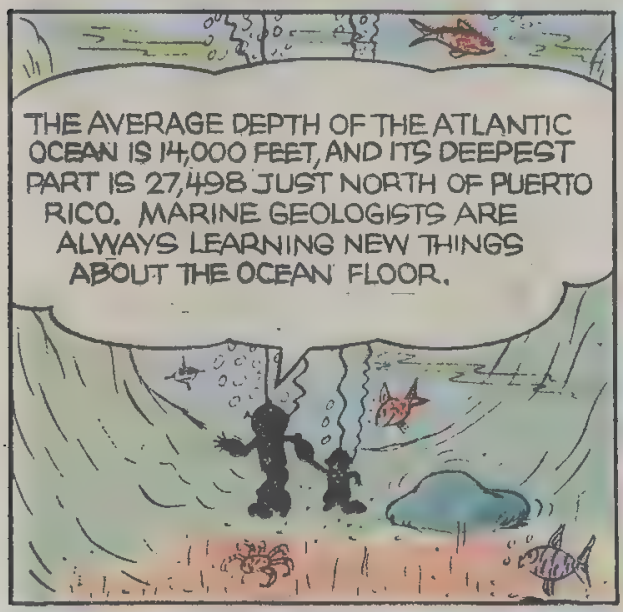


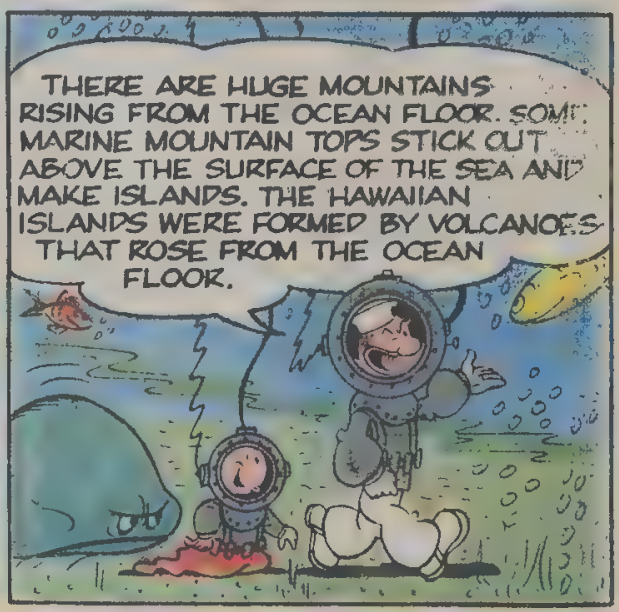

THE COMBINED WORK OF THESE OCEAN SCIENTISTS AND SPECIALISTS HAS HELPED US ALL FIND OUT A GREAT DEAL MORE ABOUT THE PART OF OUR PLANET THAT IS BENEATH THE SEA.
WE DO?

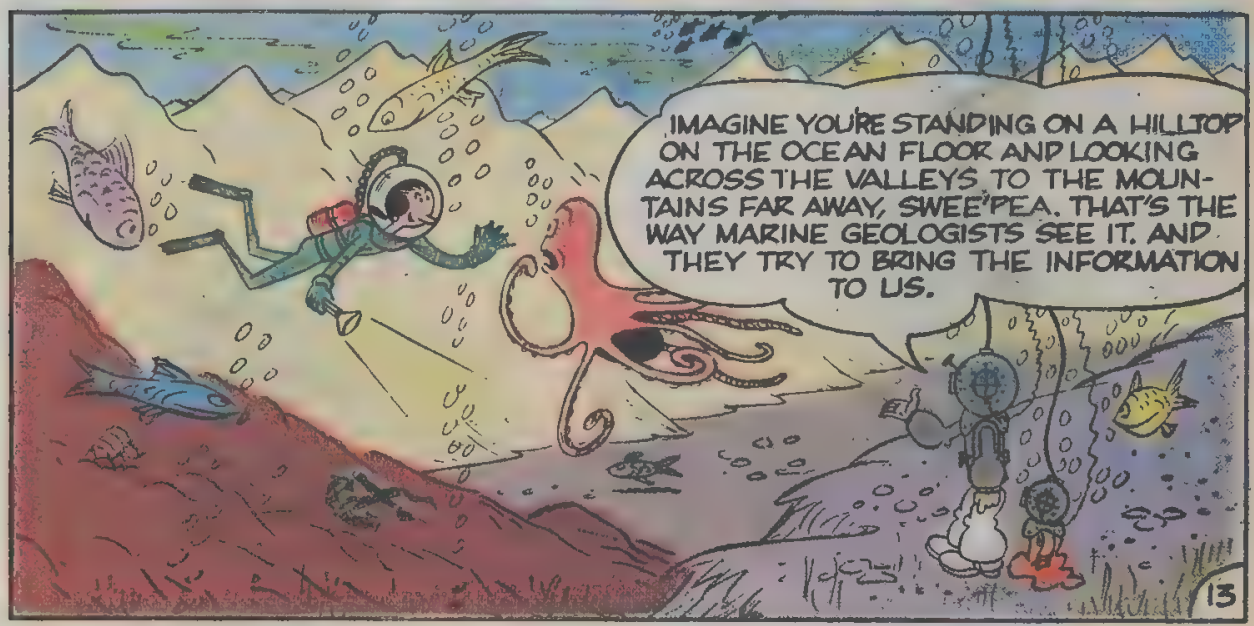

THEY KNOW A LOT ABOUT THE CONTINENTAL SHELF, THE SEA BOTTOM OFF THE EAST COAST OF THE UNITED STATES, WHICH DEEPENS TO ABOUT 600 FEET. THIS AREA IS COVERED WITH ELEMENTS AND MINERALS OF THE LAND CARRIED TO THE SEA BY RIVERS AND STREAMS.

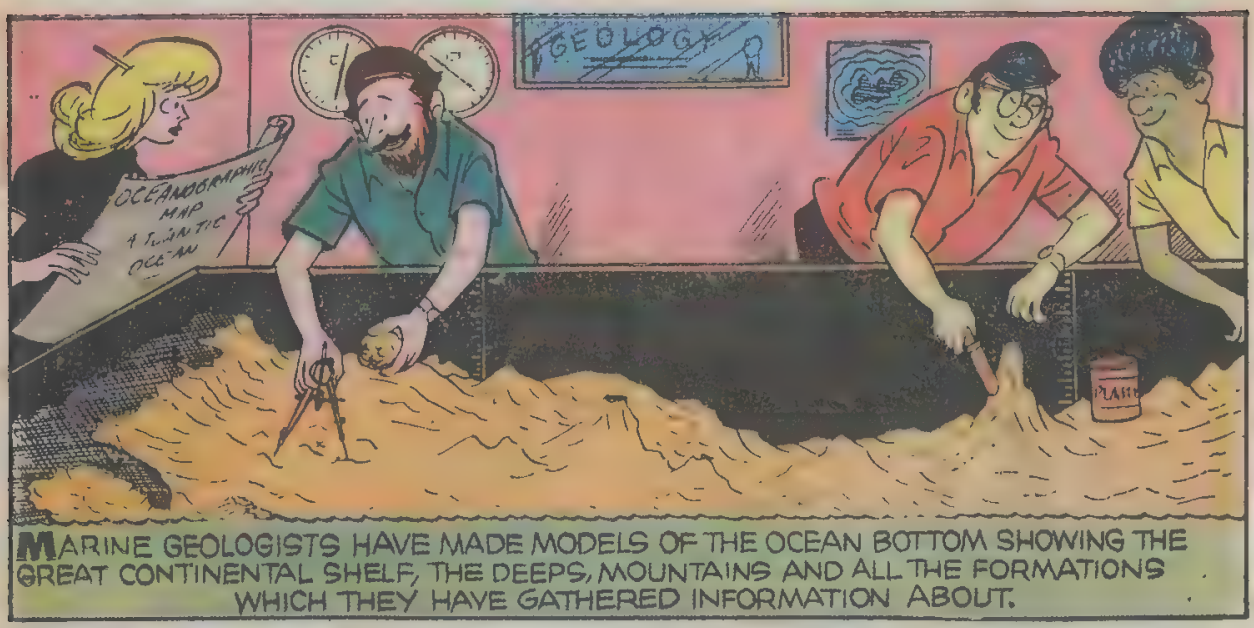

IN SOME WAYS, THE CONTINENTAL SHELF IS THE MOST IMPORTANT LAND BENEATH THE SEA. THE GREAT FISHERIES OF THE WORLD ARE FOUND ON THIS AND OTHER CONTINENTAL SHELVES. THIS SHELF ALSO CONTAINS RICH OIL FIELDS, MARINE SCIENTISTS TELL US. MANY NEW DISCOVERIES CAN BE MADE BY THOSE WHO LIKE ADVENTURE.


THE CONTINENTAL SHELF SLOPES GENTLY DOWN TO THE CONTINENTAL EDGE. THERE THE CONTINENTAL SLOPE BEGINS. IT IS MUCH STEEPER THAN THE SHELF. THE CONTINENTAL SLOPE PLUNGES TO THE DEEP OCEAN BOTTOM.

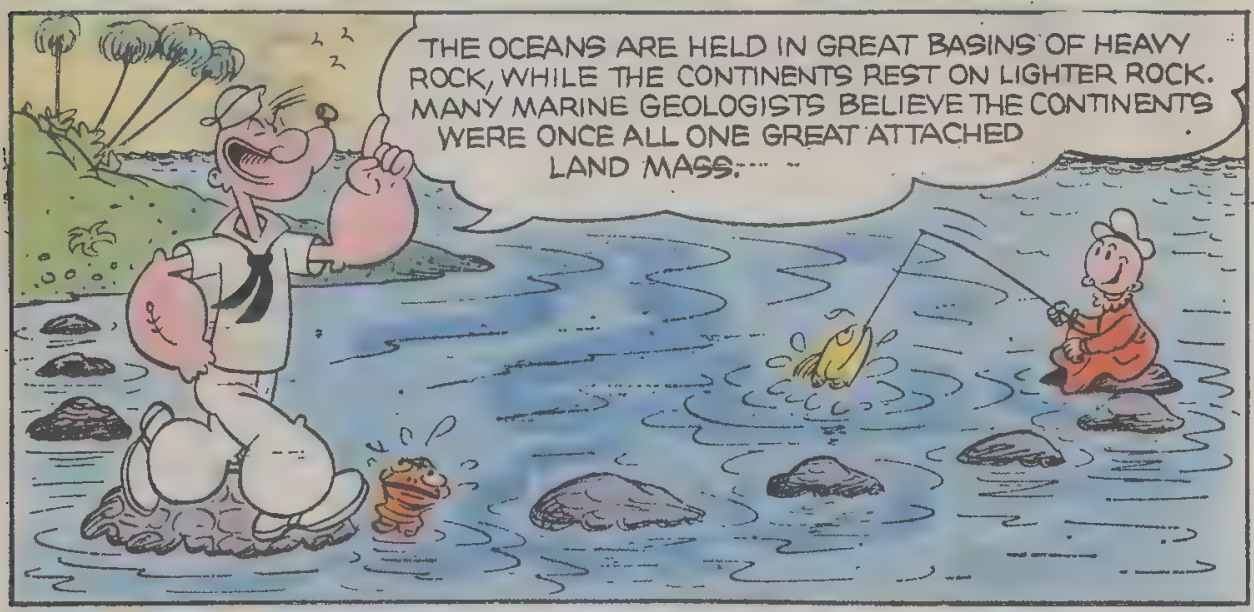

THE AVERAGE DEPTH OF THE ATLANTIC OCEAN IS 14,000 FEET, AND ITS DEEPEST PART IS 27,498 JUST NORTH OF PUERTO RICO. MARINE GEOLOGISTS ARE ALWAYS LEARNING NEW THINGS ABOUT THE OCEAN FLOOR.

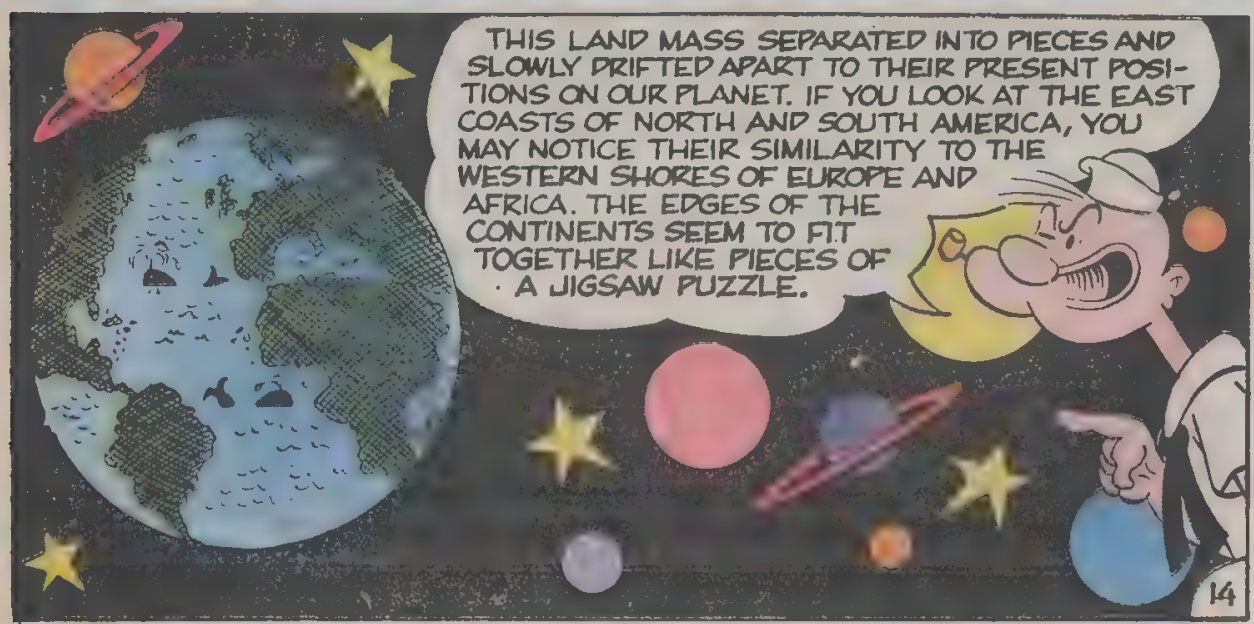

THERE ARE HUGE MOUNTAINS RISING FROM THE OCEAN FLOOR. SOME MARINE MOUNTAIN TOPS STICK OUT ABOVE THE SURFACE OF THE SEA AND MAKE ISLANDS. THE HAWAIIAN ISLANDS WERE FORMED BY VOLCANOES THAT ROSE FROM THE OCEAN FLOOR.


IMAGINE YOU'RE STANDING ON A HILLTOP ON THE OCEAN FLOOR AND LOOKING ACROSS THE VALLEYS TO THE MOUNTAINS FAR AWAY, SWEE'PEA. THAT'S THE WAY MARINE GEOLOGISTS SEE IT. AND THEY TRY TO BRING THE INFORMATION TO US.

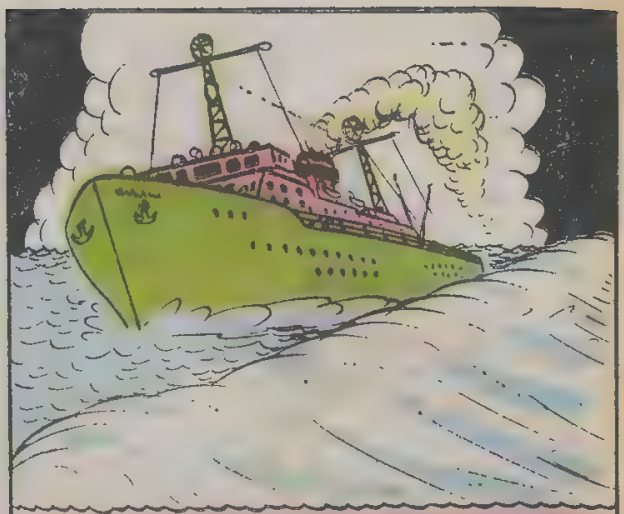


MARINE GEOLOGISTS HAVE MADE MODELS OF THE OCEAN BOTTOM SHOWING THE GREAT CONTINENTAL SHELF, THE DEEPS, MOUNTAINS AND ALL THE FORMATIONS WHICH THEY HAVE GATHERED INFORMATION ABOUT.

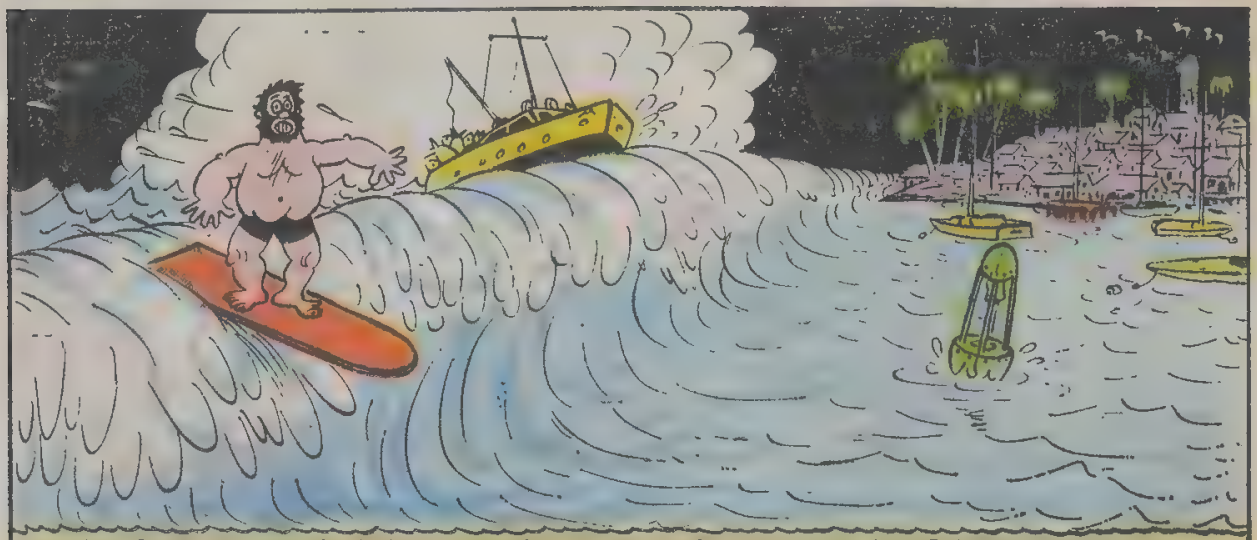




IN CERTAIN PARTS OF THE OCEAN THERE ARE FAULTS IN THE OCEAN FLOOR. WHEN THESE SHIFT, THEY CAUSE EARTHQUAKES WHICH START HUGE WAVES IN MOTION.

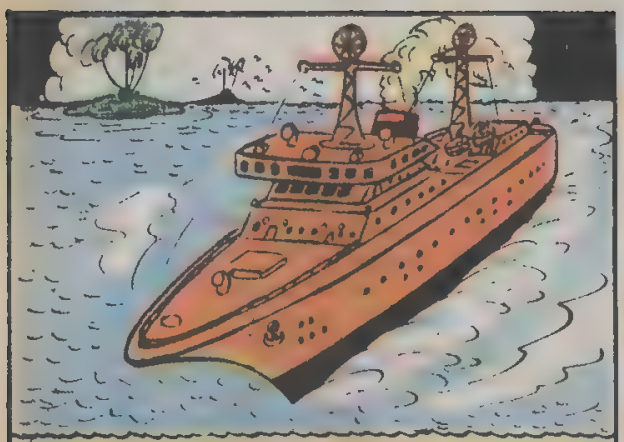


THIS IS CALLED A TIDAL WAVE. THE SCIENTISTS ALSO CALL IT A TSUNAMI. FAR OUT AT SEA THE TSUNAMI IS NOT DANGEROUS.



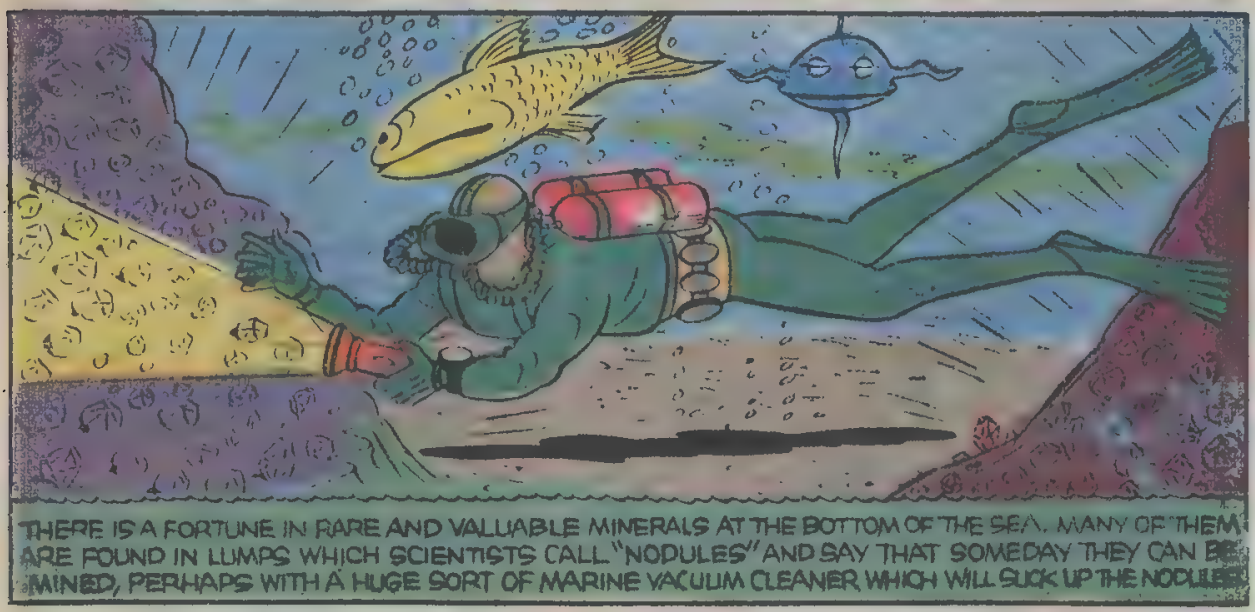
WHEN THE TSUNAMI COMES CLOSE TO SHORE AND FUNNELS INTO A BAY OR HARBOR IT MAY REACH TREMENDOUS HEIGHTS.

A TSUNAMI HAS BEEN KNOWN TO WIPE OUT ENTIRE VILLAGES ON LAND. MOST TSUNAMIS START FROM JAPAN, ALASKA OR CHILE AND CAN CAUSE DAMAGE THOUSANDS OF MILES AWAY.

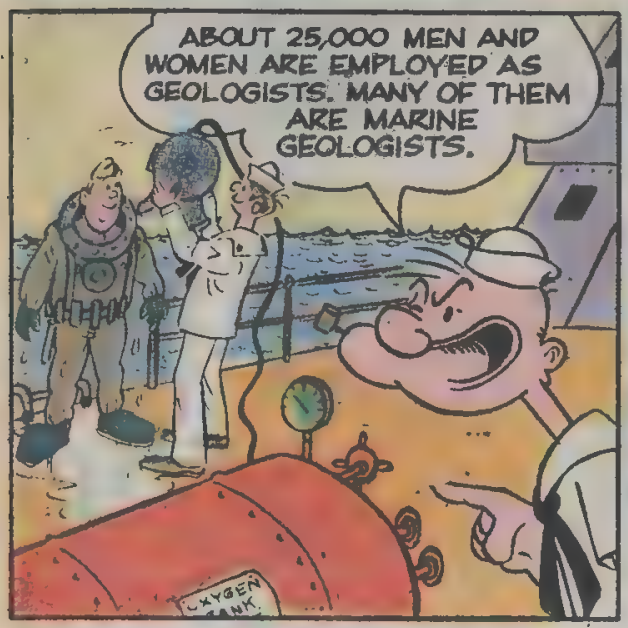


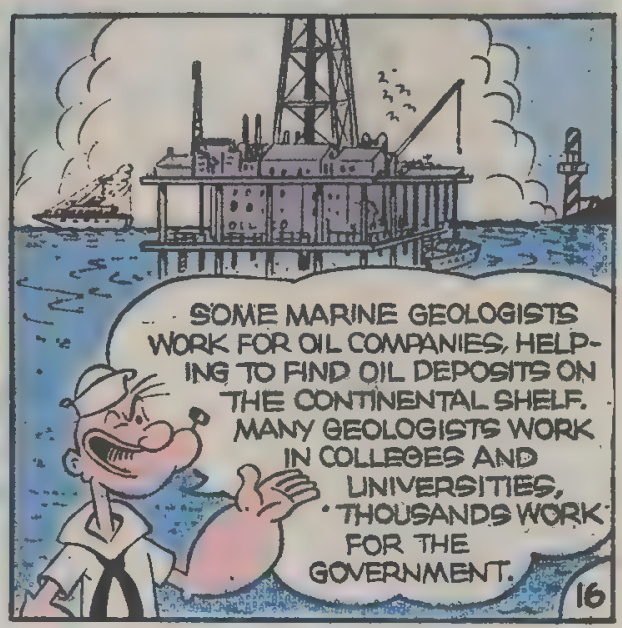
MARINE GEOLOGISTS ARE CONSTANTLY WATCHING FOR TSUNAMIS AND OTHER TYPES OF DANGER TO MANKIND. WHEN A MARINE EARTHQUAKE IS RECORDED BY SCIENTIFIC INSTRUMENTS, A TIDAL WAVE WATCH BEGINS AND PEOPLE ARE WARNED IF ONE IS COMING.

MARINE GEOLOGISTS HAVE LEARNED THAT BASALT IS THE MAIN ROCK OF THE OCEAN FLOOR, AND THAT LAYERS OF MUD, CALLED OOZE, HAVE COVERED THE PLAINS AND FILLED SOME OF THE TRENCHES OVER MANY MILLIONS OF YEARS.



THERE IS A FORTUNE IN RARE AND VALUABLE MINERALS AT THE BOTTOM OF THE SEA. MANY OF THEM ARE FOUND IN LUMPS WHICH SCIENTISTS CALL "NODULES" AND SAY THAT SOMEDAY THEY CAN BE MINED, PERHAPS WITH A HUGE SORT OF MARINE VACUUM CLEANER WHICH WILL SUCK UP THE NODULES.





KIDS WHO WANT TO BE MARINE GEOLOGISTS SHOULD PLAN TO GRADUATE COLLEGE AND GO ON TO A MASTER'S DEGREE IF THEY WANT TO TEACH, DO RESEARCH OR EXPLORATION. AFTER 4 YEARS OF COLLEGE THEY CAN BE EXPLORER ASSISTANTS.

MARINE LIFE

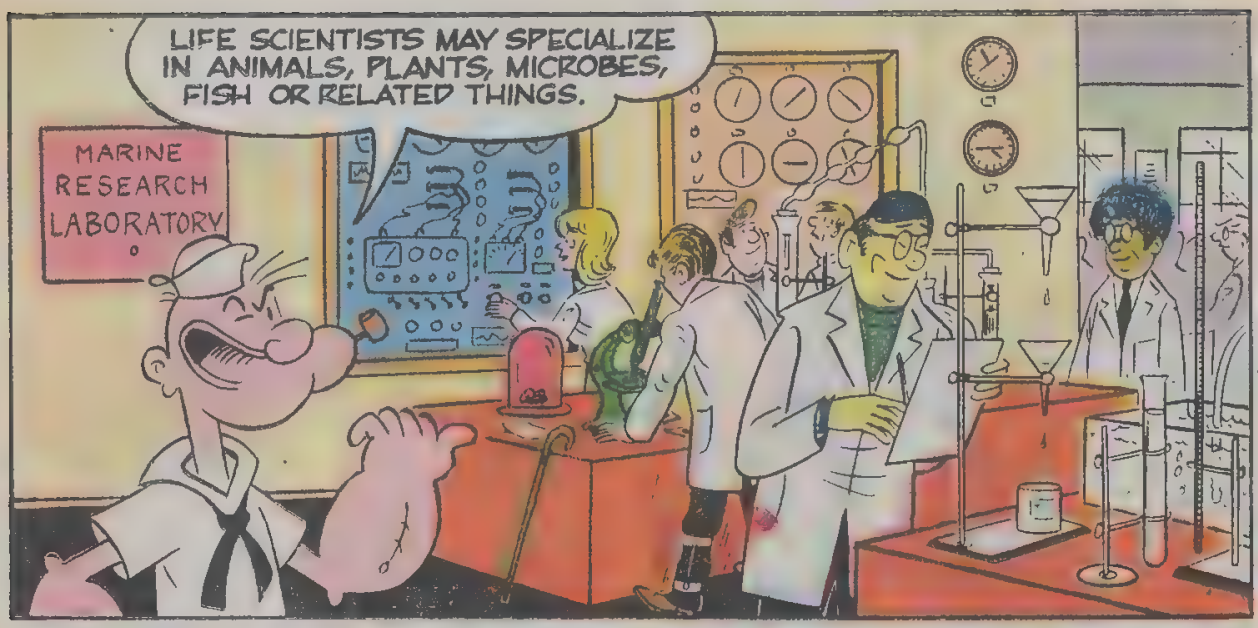
MEN AND WOMEN WHO BECOME MARINE GEOLOGISTS USUALLY FIND THIS CAREER HIGHLY REWARDING. THEY ARE AWAY FROM HOME A LOT AND THEY SOMETIMES WORK LONG HOURS BECAUSE THEY ARE SO INTERESTED IN WHAT THEY DO.

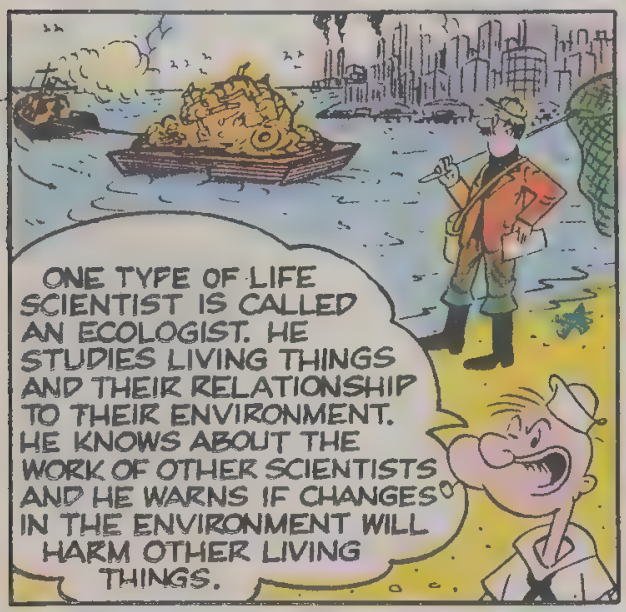
OTHER KINDS OF SCIENTISTS ARE CONSTANTLY STUDYING THE OCEANS AND THE LIVING THINGS IN THEM.

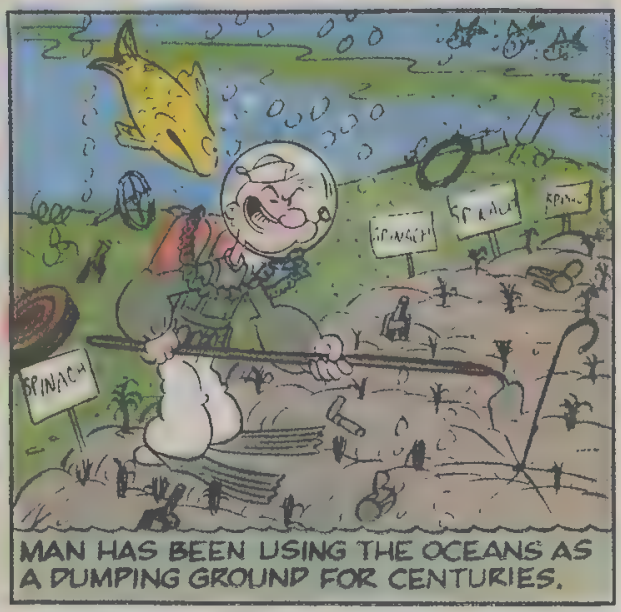
LIFE SCIENTISTS ARE CONCERNED WITH MEN, MICROBES, PLANTS, ANIMALS AND HEALTH AND DISEASE, BOTH ON THE LAND AND BENEATH THE SEA.

MARINE LABORATORY

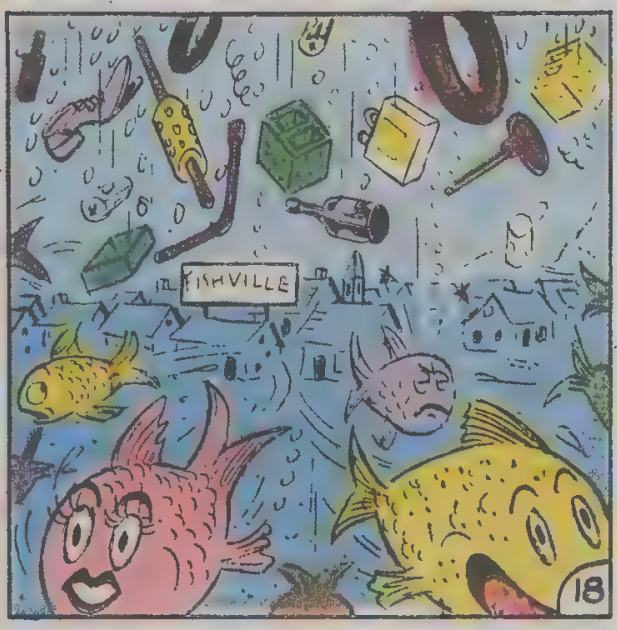
SOME OF THE LIFE SCIENTISTS MOSTLY DO RESEARCH TO GATHER MORE INFORMATION ABOUT LIFE ON OUR PLANET. MANY LIFE SCIENTISTS PASS THIS INFORMATION ON TO OTHERS. THEY ARE TEACHERS.

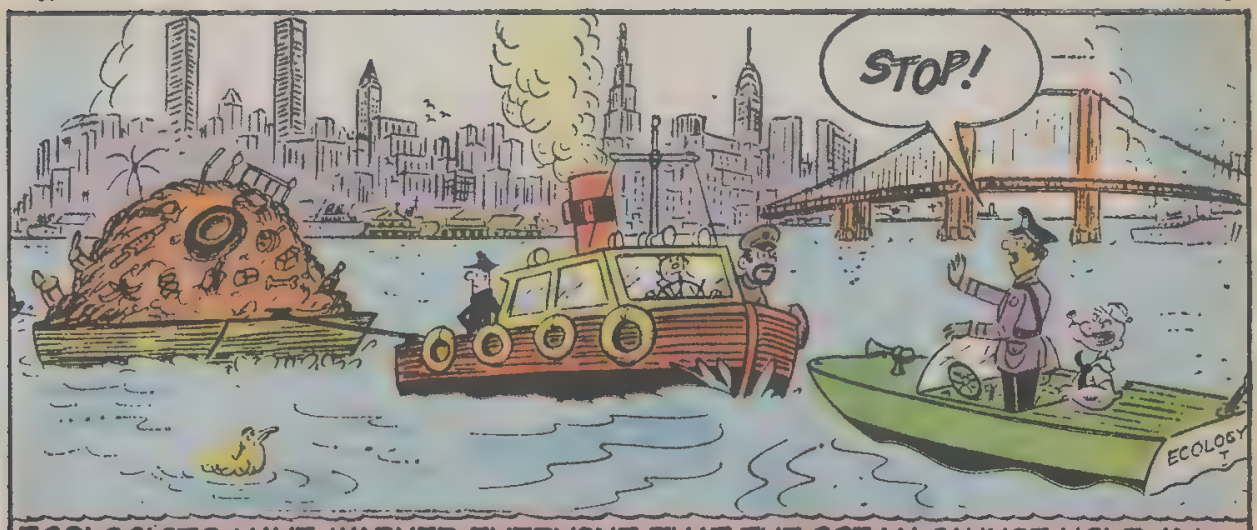

LIFE SCIENTISTS MAY SPECIALIZE IN ANIMALS, PLANTS, MICROBES, FISH OR RELATED THINGS.
MARINE RESEARCH LABORATORY


ONE TYPE OF LIFE SCIENTIST IS CALLED AN ECOLOGIST. HE STUDIES LIVING THINGS AND THEIR RELATIONSHIP TO THEIR ENVIRONMENT. HE KNOWS ABOUT THE WORK OF OTHER SCIENTISTS AND HE WARNS IF CHANGES IN THE ENVIRONMENT WILL HARM OTHER LIVING THINGS.


SPINACH
MAN HAS BEEN USING THE OCEANS AS A DUMPING GROUND FOR CENTURIES.

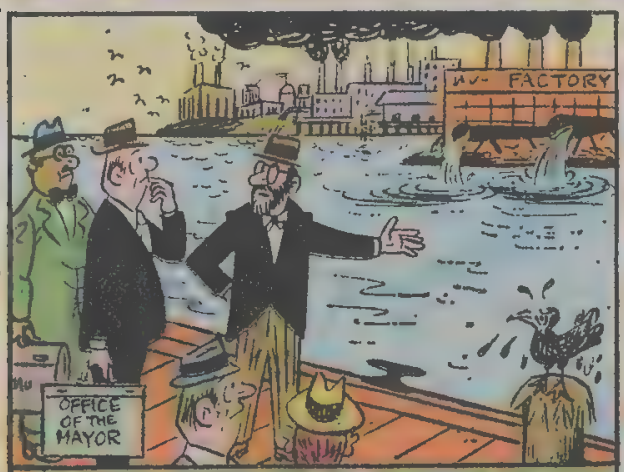

GREAT CITIES POLLUTE THE OCEANS WITH REFUSE. TONS OF OLD CONCRETE, UNUSABLE PARTS OF OLD AUTOMOBILES AND EVEN RAW SEWAGE ARE EMPTIED INTO THE SEA.


FISHVILLE
18

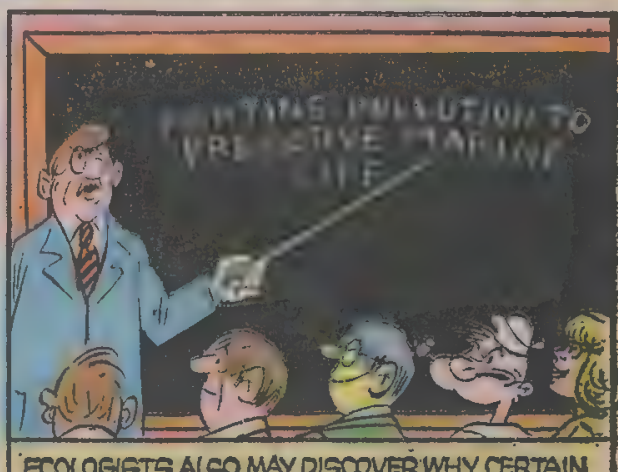


ECOLOGISTS HAVE WARNED EVERYONE THAT THE OCEAN CANNOT HOLD ALL THESE THINGS WITHOUT DAMAGE TO LIFE. MAN WILL HAVE TO FIND OTHER WAYS TO GET RID OF RUBBISH.

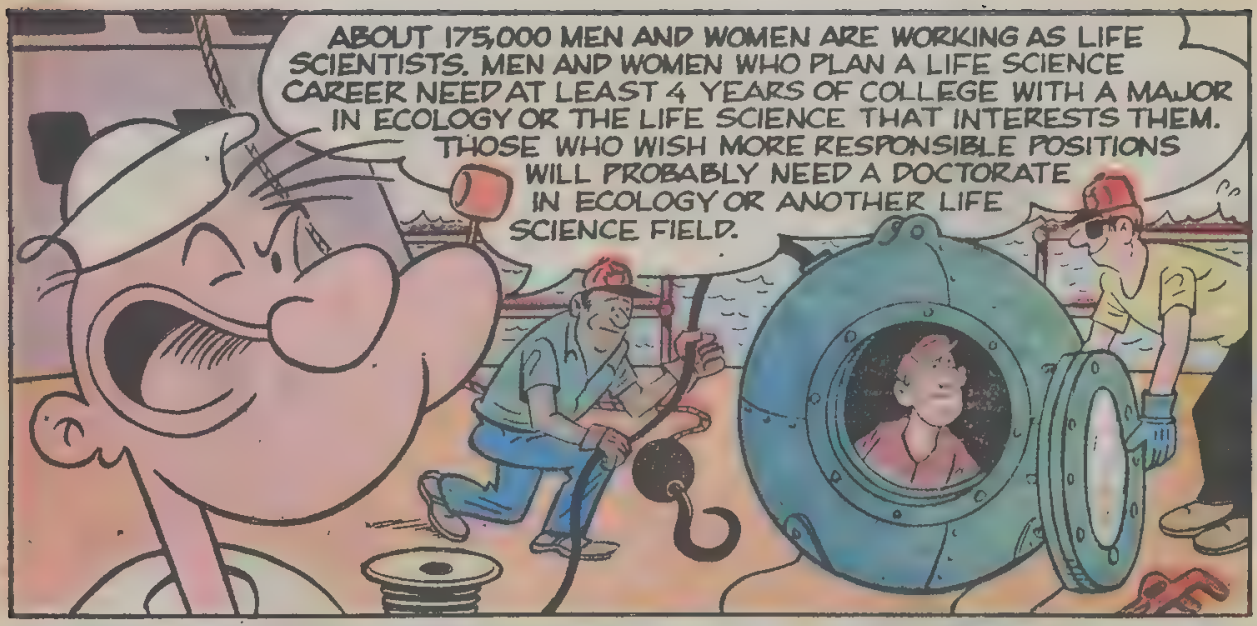
AS POPULATIONS INCREASE, MAN WILL NEED MORE FISH FROM THE SEA. BUT IF GARBAGE AND SEWAGE KEEP BEING DUMPED INTO OUR OCEANS, THERE WON'T BE ANY FISH TO CATCH.

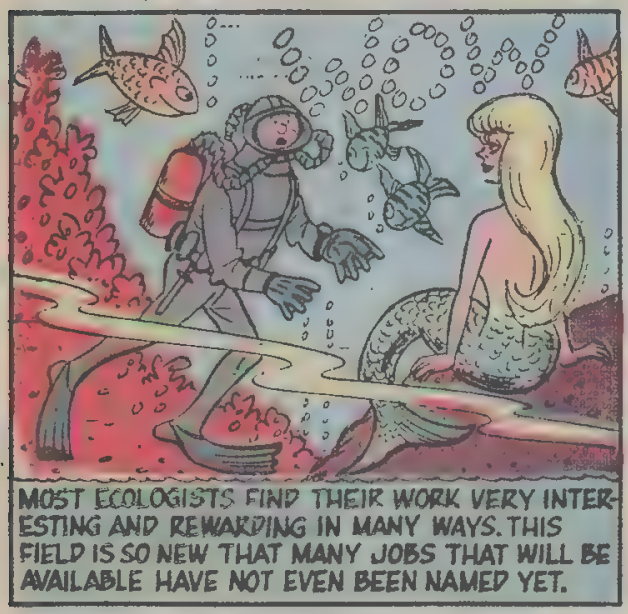


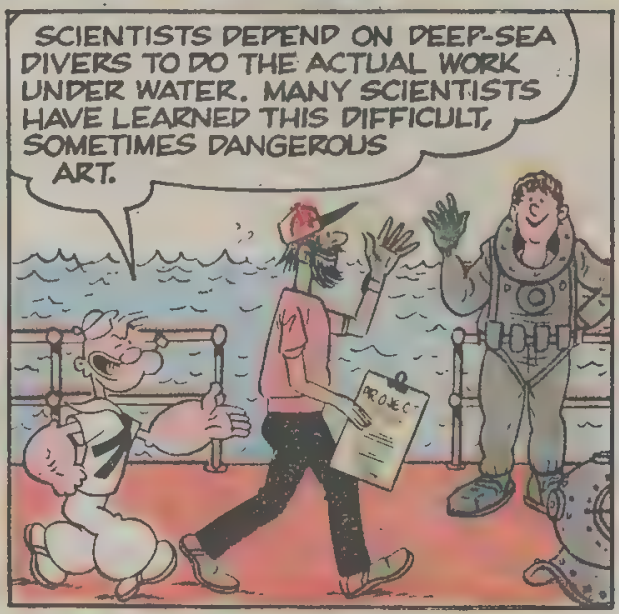
ECOLOGISTS STUDY THE RELATIONSHIP BETWEEN LIVING THINGS AND THEIR ENVIRONMENT. THEY POINT OUT TO AUTHORITIES AND THOSE WHO CAUSE POLLUTION THE DANGER TO LIFE IN THE OCEANS, AND SUGGEST CHANGES.

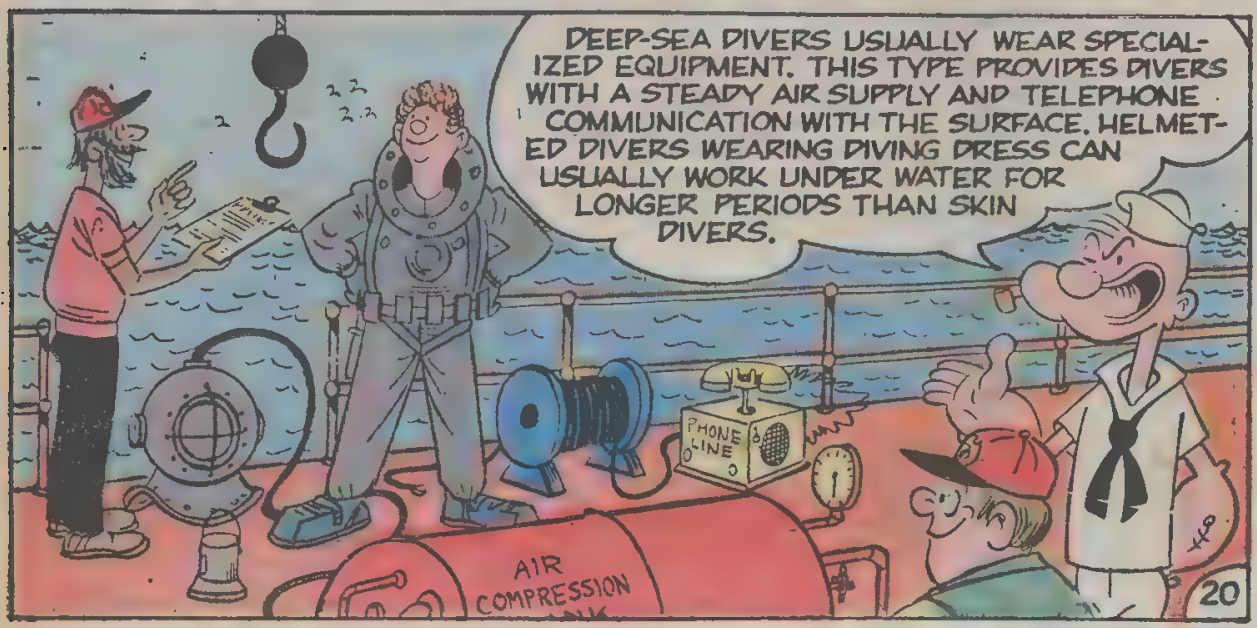


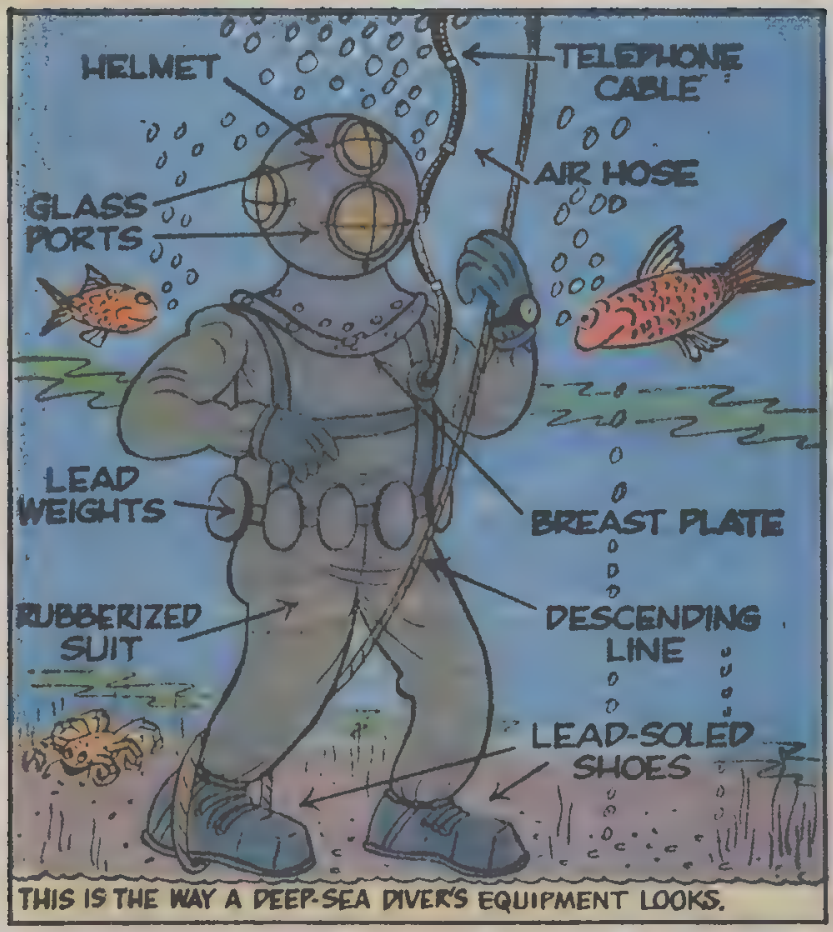
ECOLOGISTS ALSO MAY DISCOVER WHY CERTAIN SPECIES OF MARINE LIFE BECOME EXTINCT. THEIR SUGGESTIONS MAY SAVE SOME FISHING AND FOOD-PREPARATION INDUSTRIES. THIS OF COURSE WILL PROVIDE BETTER FOOD FOR US AT A LOWER COST TO THE CONSUMER.


ABOUT 175,000 MEN AND WOMEN ARE WORKING AS LIFE SCIENTISTS. MEN AND WOMEN WHO PLAN A LIFE SCIENCE CAREER NEED AT LEAST 4 YEARS OF COLLEGE WITH A MAJOR IN ECOLOGY OR THE LIFE SCIENCE THAT INTERESTS THEM. THOSE WHO WISH MORE RESPONSIBLE POSITIONS WILL PROBABLY NEED A DOCTORATE IN ECOLOGY OR ANOTHER LIFE SCIENCE FIELD.


MOST ECOLOGISTS FIND THEIR WORK VERY INTERESTING AND REWARDING IN MANY WAYS. THIS FIELD IS SO NEW THAT MANY JOBS THAT WILL BE AVAILABLE HAVE NOT EVEN BEEN NAMED YET.

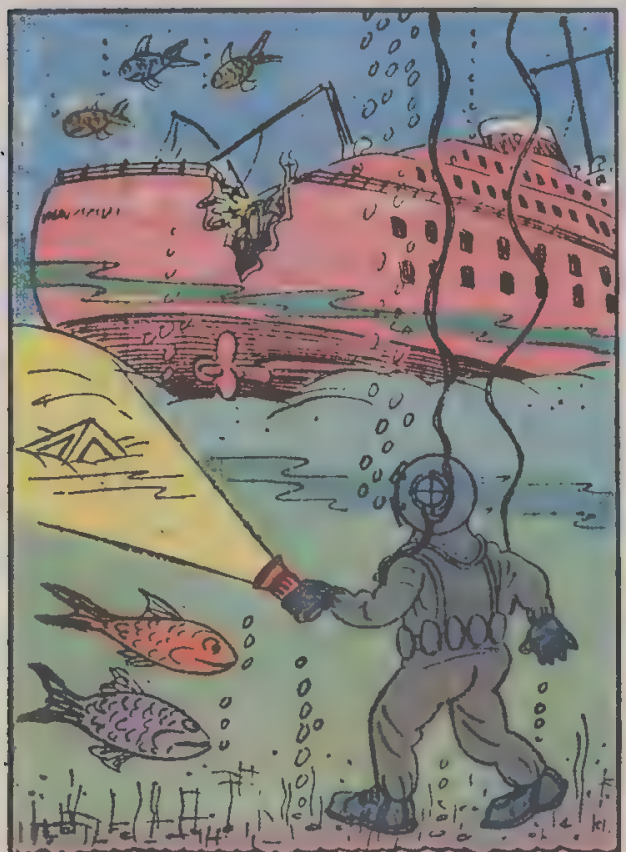

SCIENTISTS DEPEND ON DEEP-SEA DIVERS TO DO THE ACTUAL WORK UNDER WATER. MANY SCIENTISTS HAVE LEARNED THIS DIFFICULT, SOMETIMES DANGEROUS ART.


DEEP-SEA DIVERS USUALLY WEAR SPECIALIZED EQUIPMENT. THIS TYPE PROVIDES DIVERS WITH A STEADY AIR SUPPLY AND TELEPHONE COMMUNICATION WITH THE SURFACE. HELMETED DIVERS WEARING DIVING DRESS CAN USUALLY WORK UNDER WATER FOR LONGER PERIODS THAN SKIN DIVERS.
PHONE LINE
AIR COMPRESSION

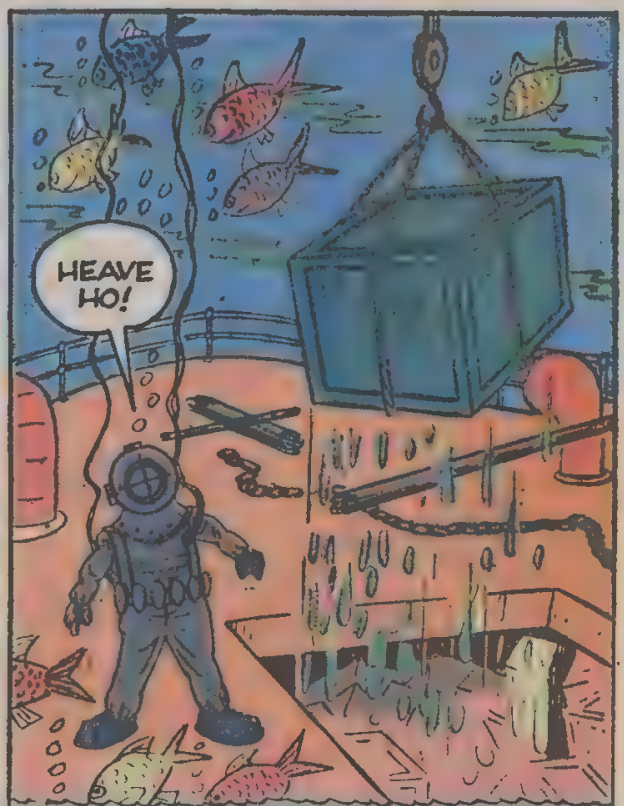


THIS IS THE WAY A DEEP-SEA DIVER'S EQUIPMENT LOOKS.

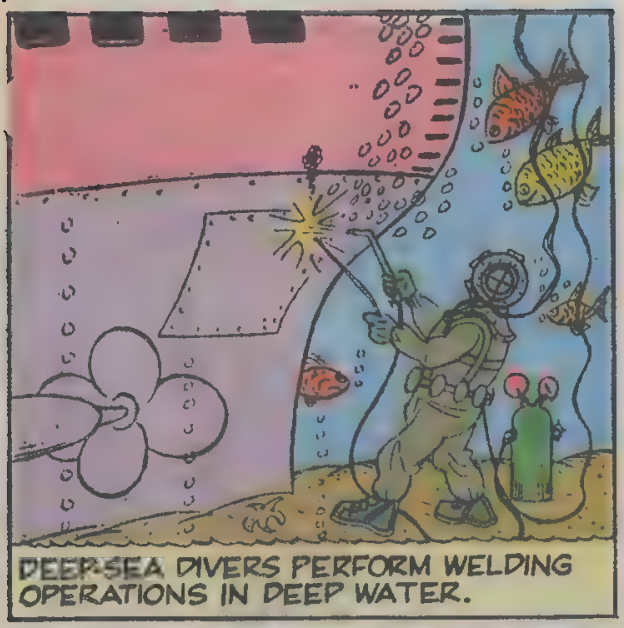
DEEP-SEA DIVERS PERFORM MANY DIFFERENT JOBS UNDER WATER. IT IS DANGEROUS WORK AND THEY MUST BE WELL-TRAINED AND VERY CAREFUL EACH TIME THEY DIVE.



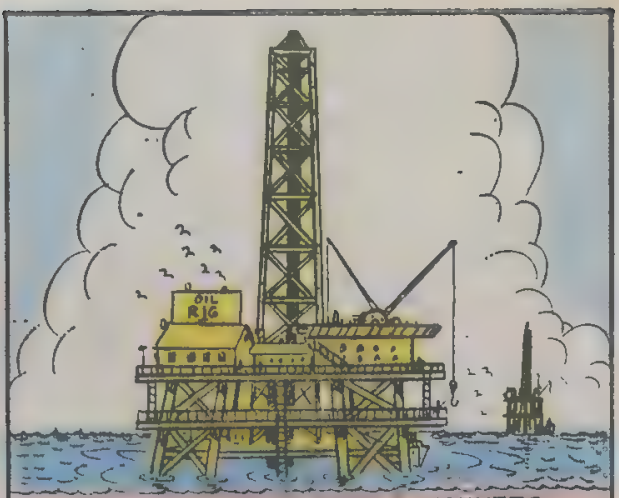
DIVERS ARE OFTEN EMPLOYED TO SALVAGE VALUABLE CARGO IN SUNKEN SHIPS.



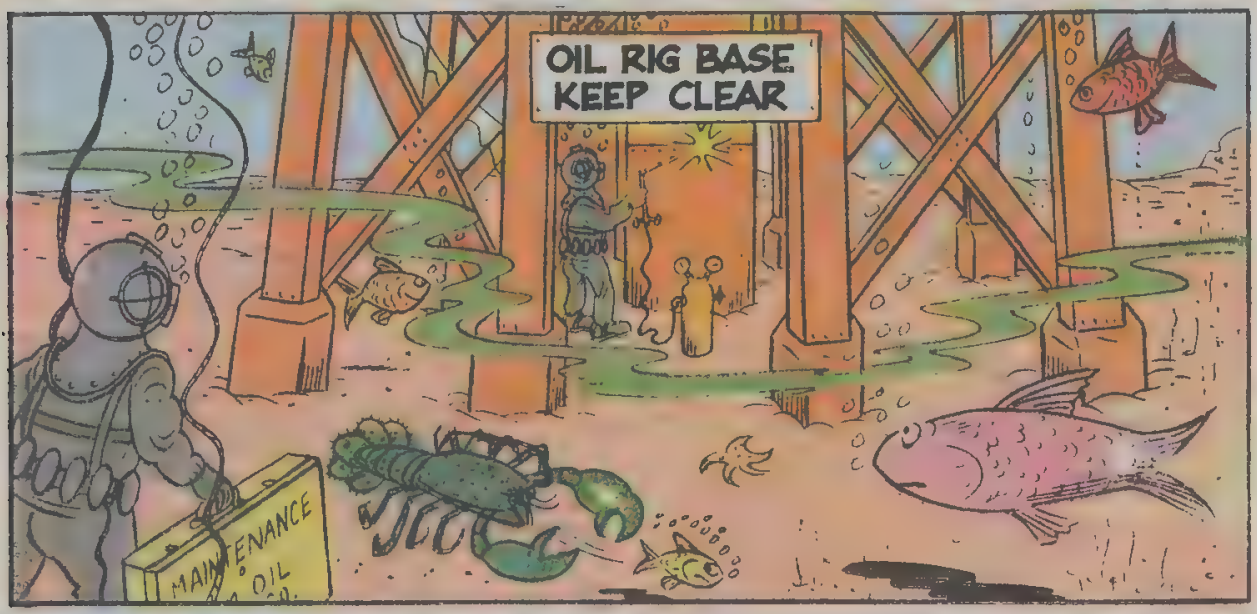
WHEN THEY FREE THE CARGO, IT IS RAISED TO THE SURFACE. SOMETIMES DIVERS WORK TO SALVAGE THE SHIP. THIS WORK REQUIRES GREAT SKILL.

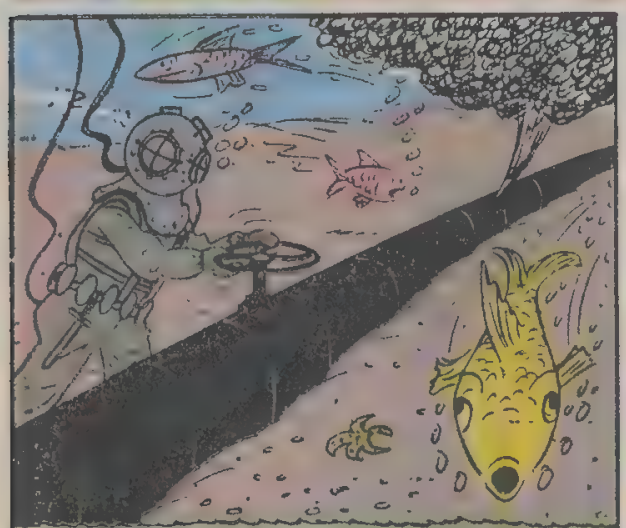


DEEP-SEA DIVERS PERFORM WELDING OPERATIONS IN DEEP WATER.

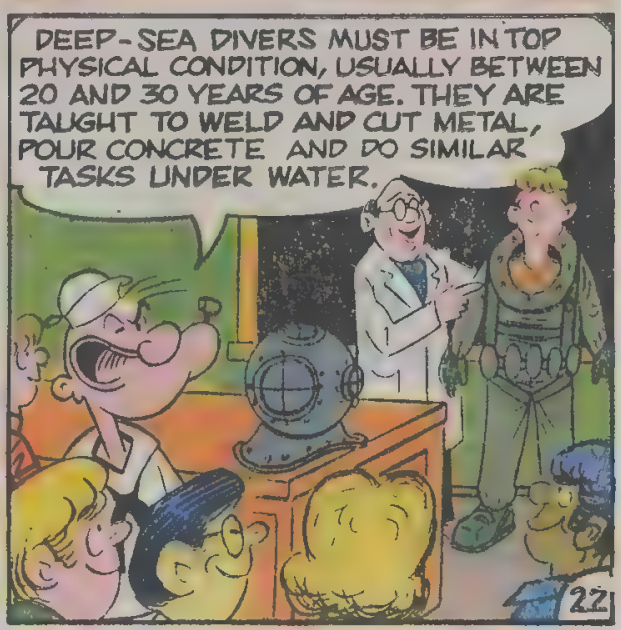


SEAMEN AND MARINE REPAIR WORKERS ASSIST DEEP-SEA DIVERS IN THEIR WORK. THEY ALSO MAINTAIN AND REPAIR OIL-RIG PLATFORMS.

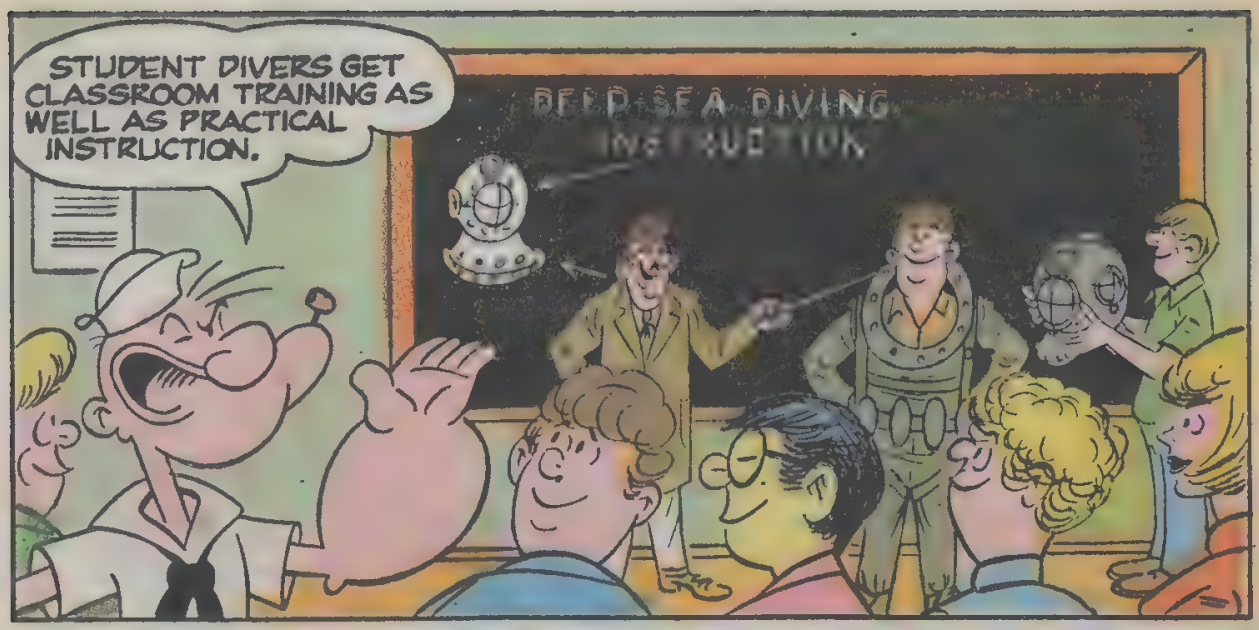


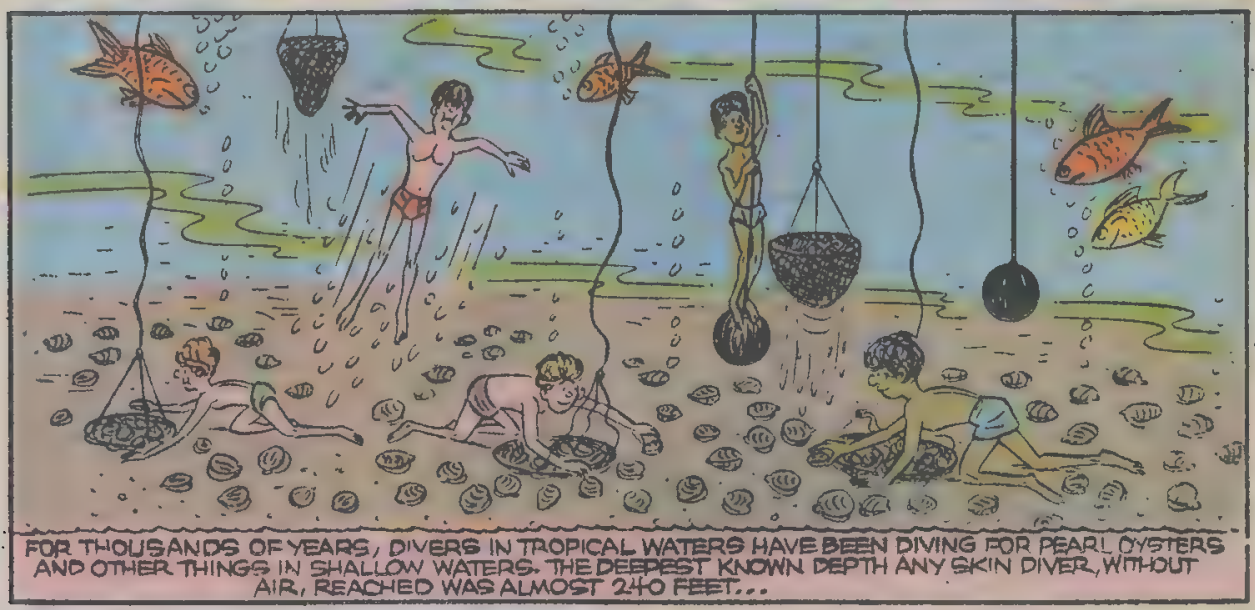


DEEP-SEA DIVERS MAINTAIN AND REPAIR ALL MAN-MADE STRUCTURES WHOSE PARTS ARE UNDER WATER. THIS DIVER IS CLOSING THE PIPELINE IN ORDER TO FIX THE LEAK.

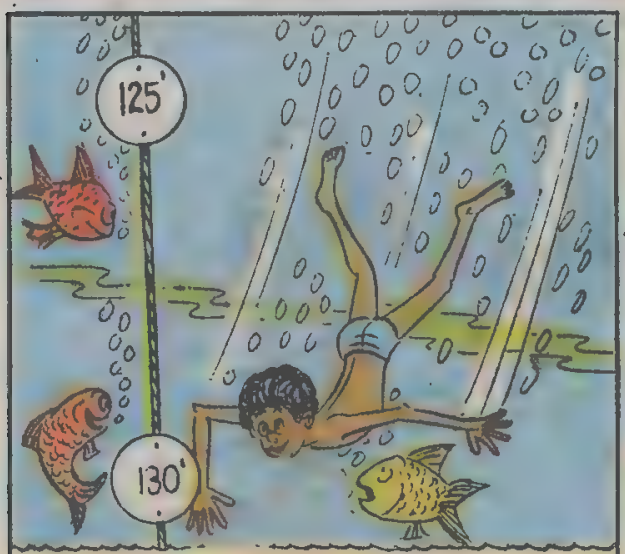


DEEP-SEA DIVERS MUST BE IN TOP PHYSICAL CONDITION, USUALLY BETWEEN 20 AND 30 YEARS OF AGE. THEY ARE TAUGHT TO WELD AND CUT METAL, POUR CONCRETE AND DO SIMILAR TASKS UNDER WATER.

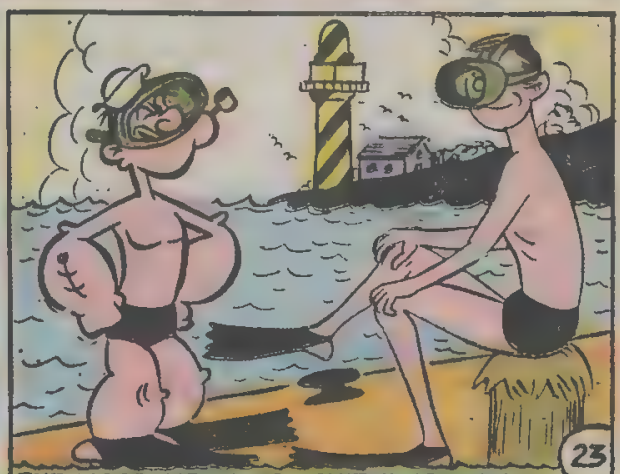




FOR THOUSANDS OF YEARS, DIVERS IN TROPICAL WATERS HAVE BEEN DIVING FOR PEARL OYSTERS AND OTHER THINGS IN SHALLOW WATERS. THE DEEPEST KNOWN DEPTH ANY SKIN DIVER, WITHOUT AIR, REACHED WAS ALMOST 240 FEET...



THE NAVY DIVE MANUAL RECOMMENDS THAT THE MAXIMUM BE 132 FEET.



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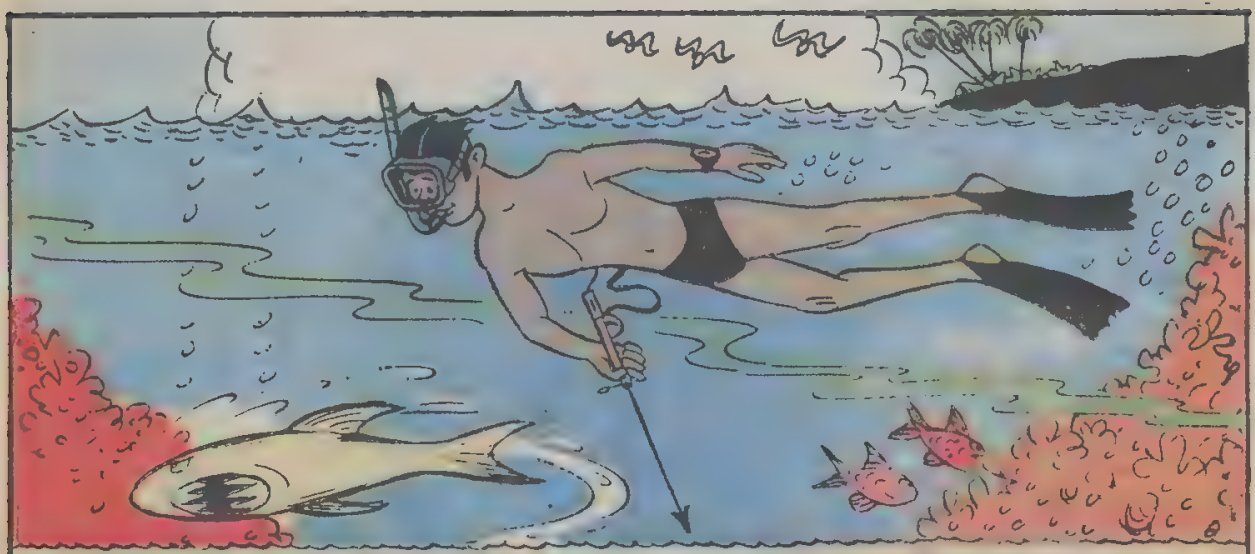
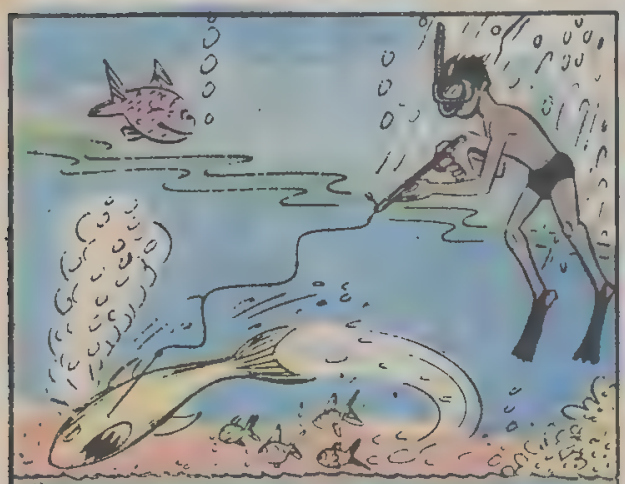
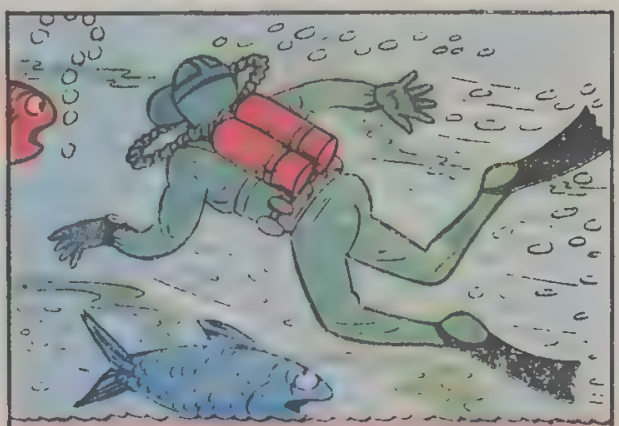
THE MOST IMPORTANT EQUIPMENT FOR SKIN DIVING IS A FACE MASK AND FLIPPERS. THE FACE MASK ENABLES THE DIVER TO SEE CLEARLY BENEATH THE SURFACE. THE FLIPPERS LET THE DIVER SWIM FASTER AND FARTHER WITH LESS EFFORT.



A SNORKEL IS A TUBE ATTACHED TO THE MASK. IT ENABLES THE DIVER TO BREATHE SURFACE AIR WITH HIS FACE UNDER WATER SO HE CAN SEE WHAT IS BELOW HIM.

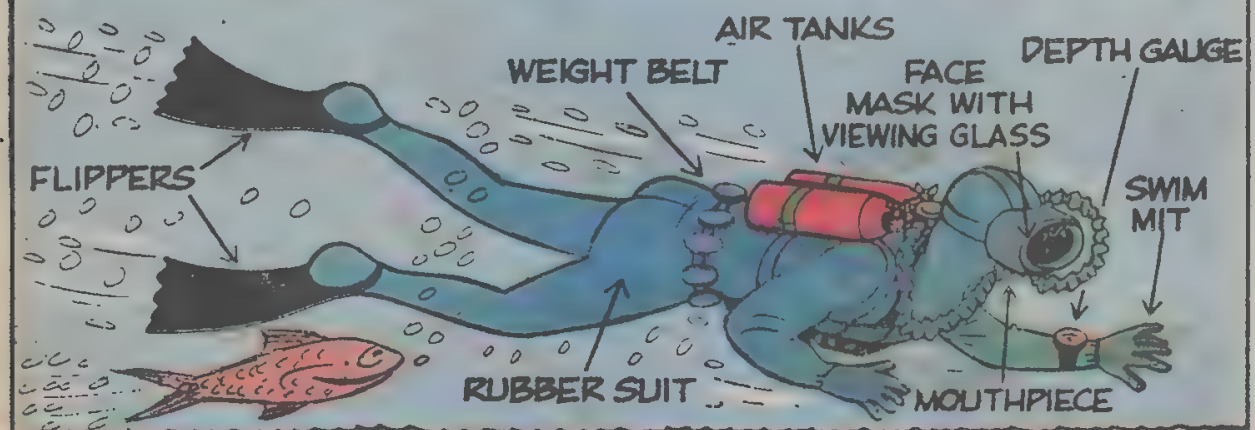


THE SNORKEL IS BUILT SO THAT THE DIVER CAN KEEP OUT WATER IF HE GOES DEEPER TO SPEAR FISH OR FOR ANY OTHER REASON.

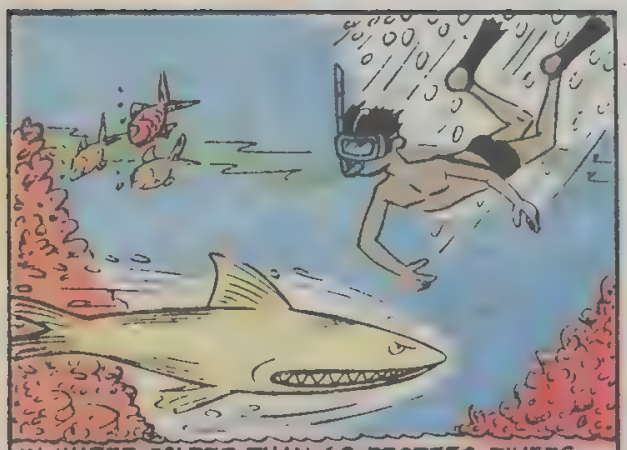


THE SCUBA DIVER HAS FAR GREATER RANGE. HE USES SPECIAL EQUIPMENT CALLED LUNGS TO BREATHE UNDER WATER. THE TECHNICAL TERM FOR THESE LUNGS IS "SELF-CONTAINED UNDERWATER BREATHING APPARATUS." THE INITIALS FORM THE WORD *SCUBA*.

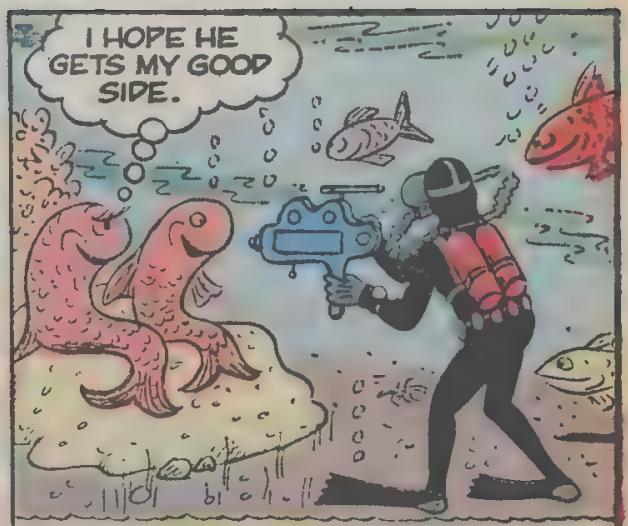
SCUBA DIVER AND EQUIPMENT



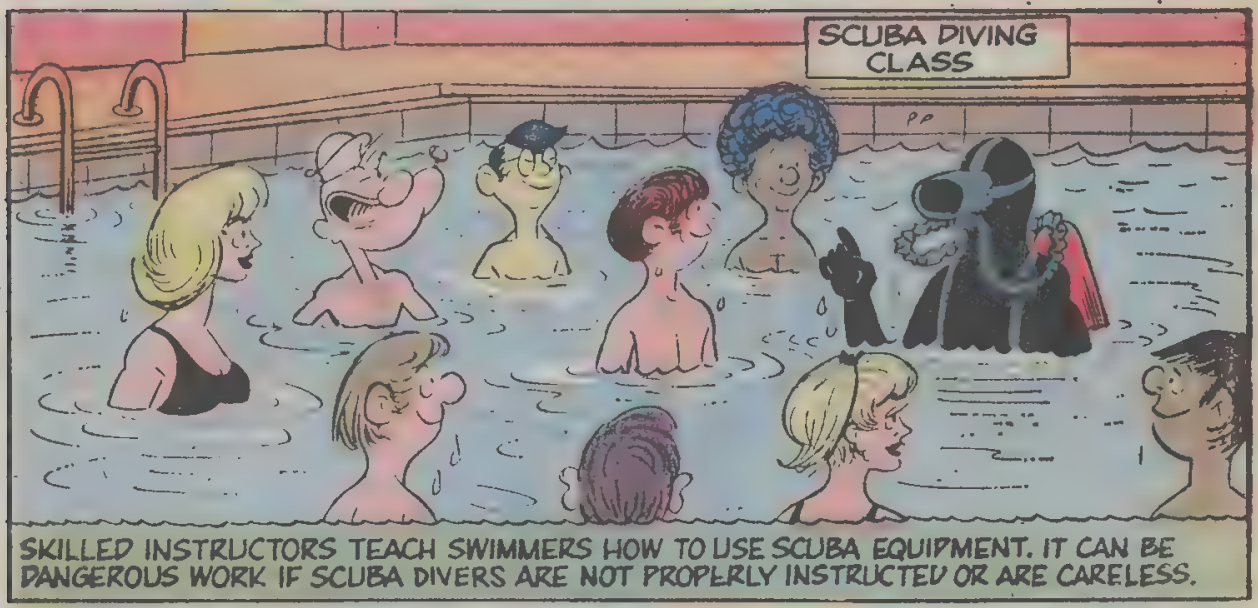
SCUBA DIVERS HAVE DESCENDED TO 297 FEET. HERE IS THE EQUIPMENT AN AVERAGE SCUBA DIVER USES IN HIS WORK. SCUBA DIVERS DO MANY OF THE THINGS A HELMETED DIVER DOES. HE DOES NOT HAVE TELEPHONE COMMUNICATION WITH THE SURFACE, BUT HE IS NOT LIMITED IN HIS MOVEMENTS BY ATTACHED LINES.



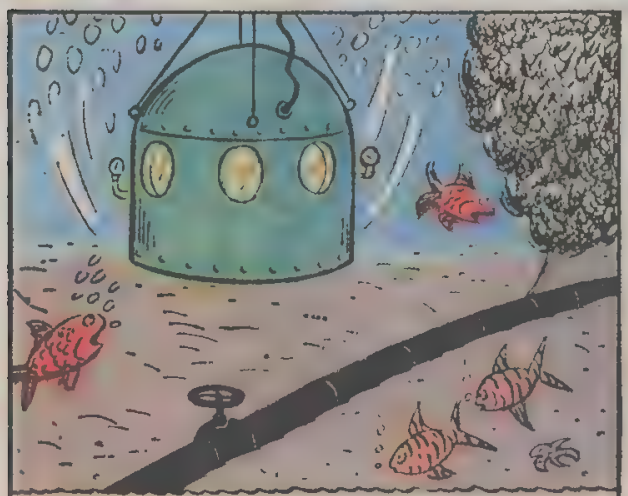
IN WATER COLDER THAN 60 DEGREES, DIVERS WEAR A THIN RUBBER SUIT CALLED A WET SUIT. IN VERY COLD WATER THEY USUALLY WEAR A WATERTIGHT DRY SUIT WHICH KEEPS OUT THE WATER. BENEATH THE DRY SUIT THE DIVER WEARS LONG WOOLEN UNDERWEAR.



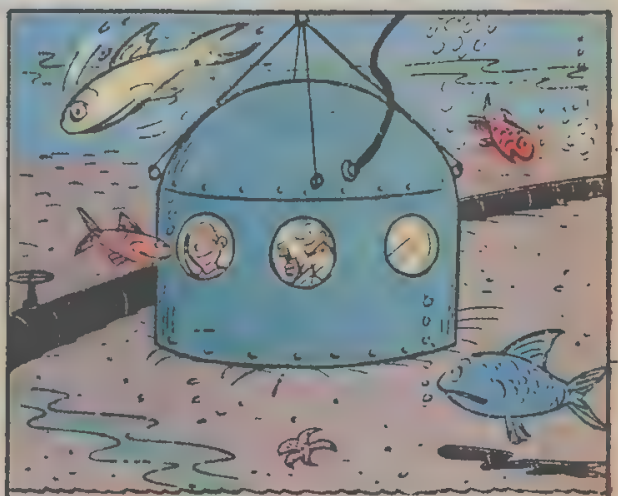
SCUBA EQUIPMENT IS FREQUENTLY USED IN RESEARCH WORK BY OCEANOGRAPHERS AND MARINE SCIENTISTS.



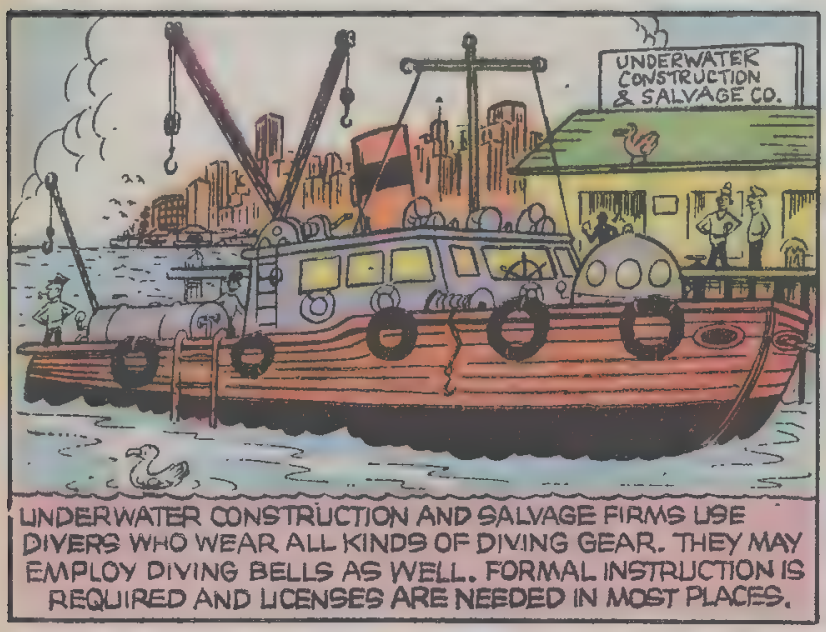
SKILLED INSTRUCTORS TEACH SWIMMERS HOW TO USE SCUBA EQUIPMENT. IT CAN BE DANGEROUS WORK IF SCUBA DIVERS ARE NOT PROPERLY INSTRUCTED OR ARE CARELESS.



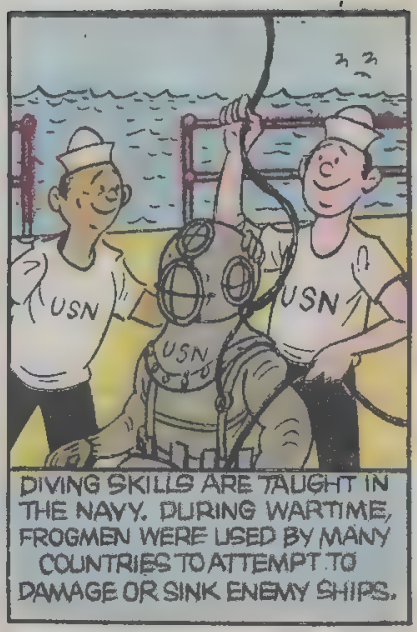
A DIVING BELL IS A METAL CHAMBER USED AS AN UNDERWATER WORKROOM. AIR IS PUMPED TO THE WORKERS IN IT FROM THE SURFACE.



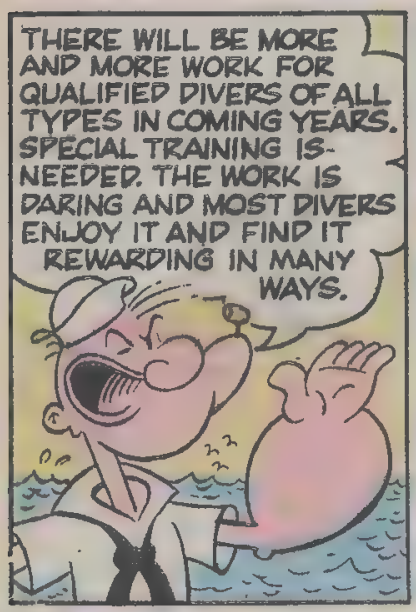
THE BELL IS LOWERED TO THE BOTTOM AND THE WORKMEN HAVE ROOM TO WORK INSIDE THE BELL. SPECIAL MARINE WORKMEN USE THIS EQUIPMENT.

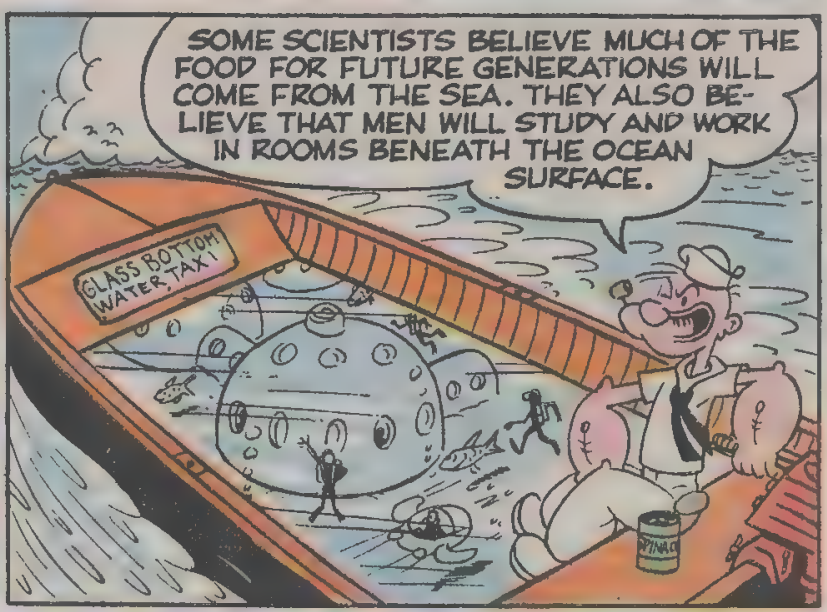


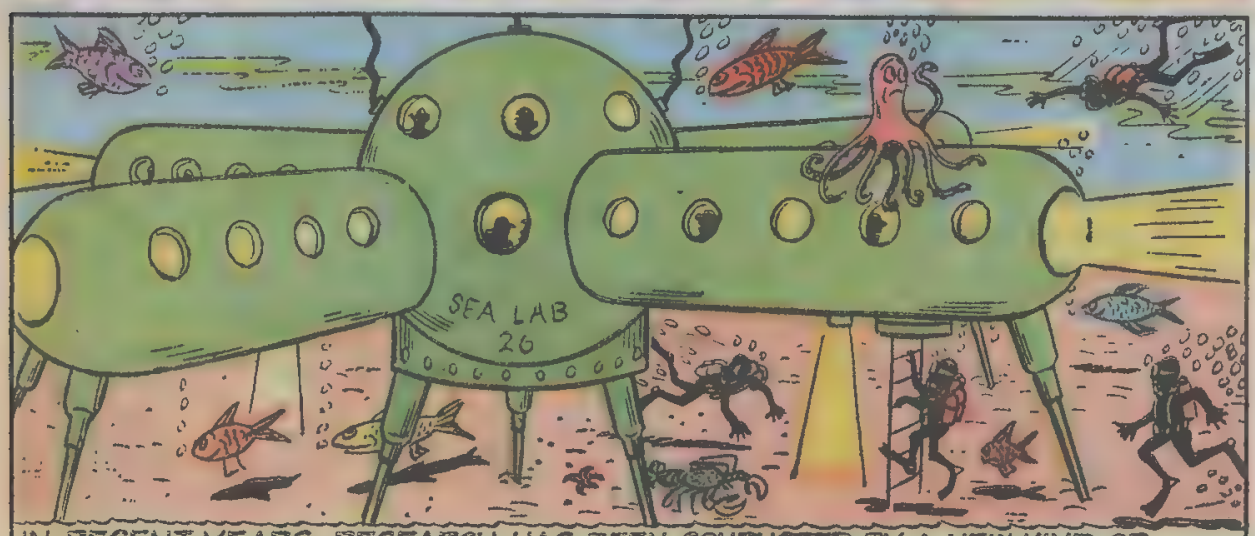
UNDERWATER CONSTRUCTION AND SALVAGE FIRMS USE DIVERS WHO WEAR ALL KINDS OF DIVING GEAR. THEY MAY EMPLOY DIVING BELLS AS WELL. FORMAL INSTRUCTION IS REQUIRED AND LICENSES ARE NEEDED IN MOST PLACES.



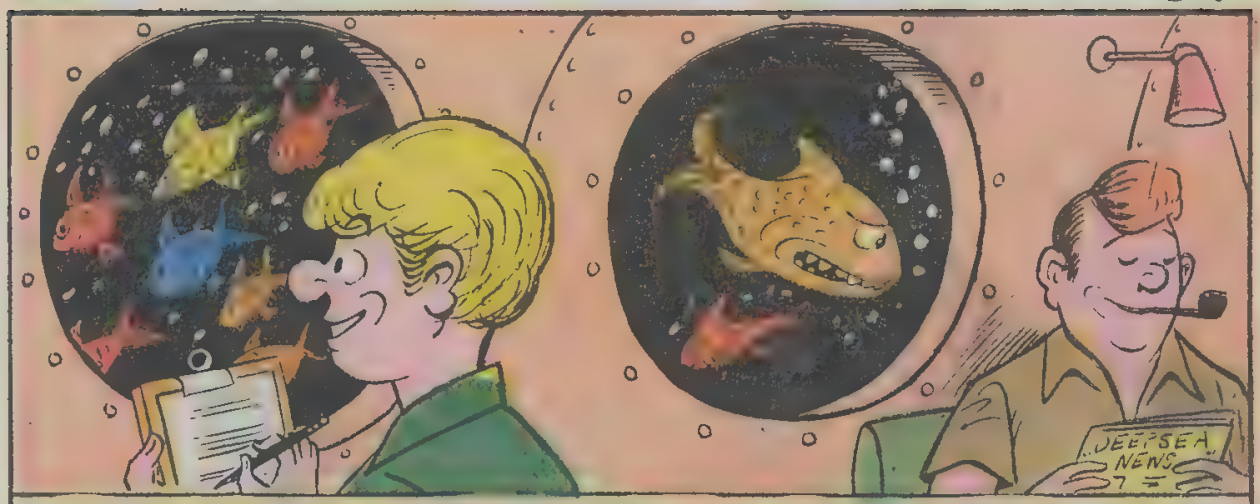
DIVING SKILLS ARE TAUGHT IN THE NAVY. DURING WARTIME, FROGMEN WERE USED BY MANY COUNTRIES TO ATTEMPT TO DAMAGE OR SINK ENEMY SHIPS.



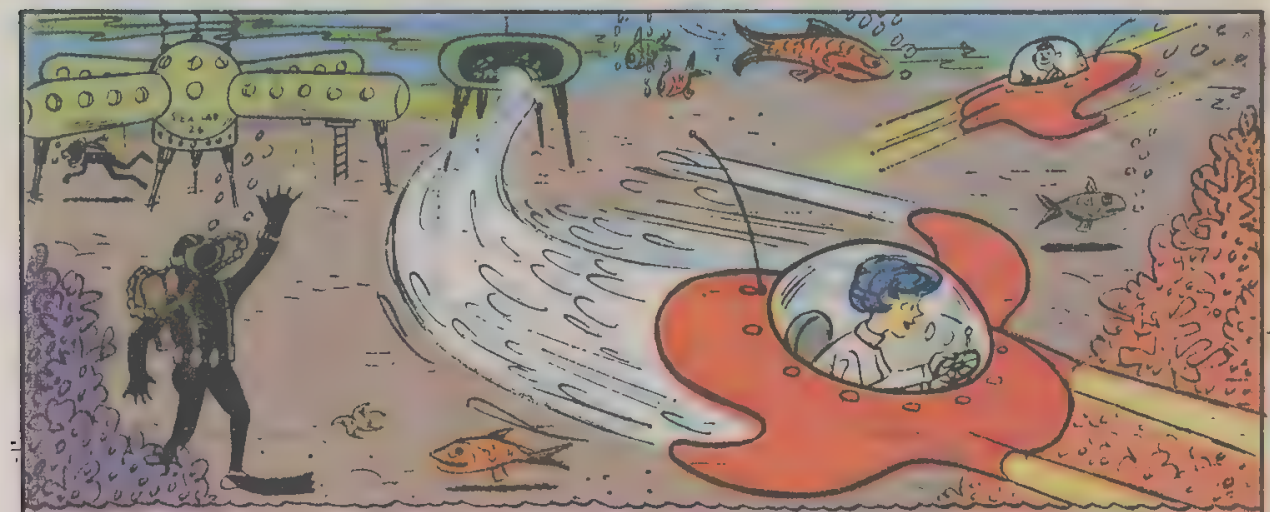




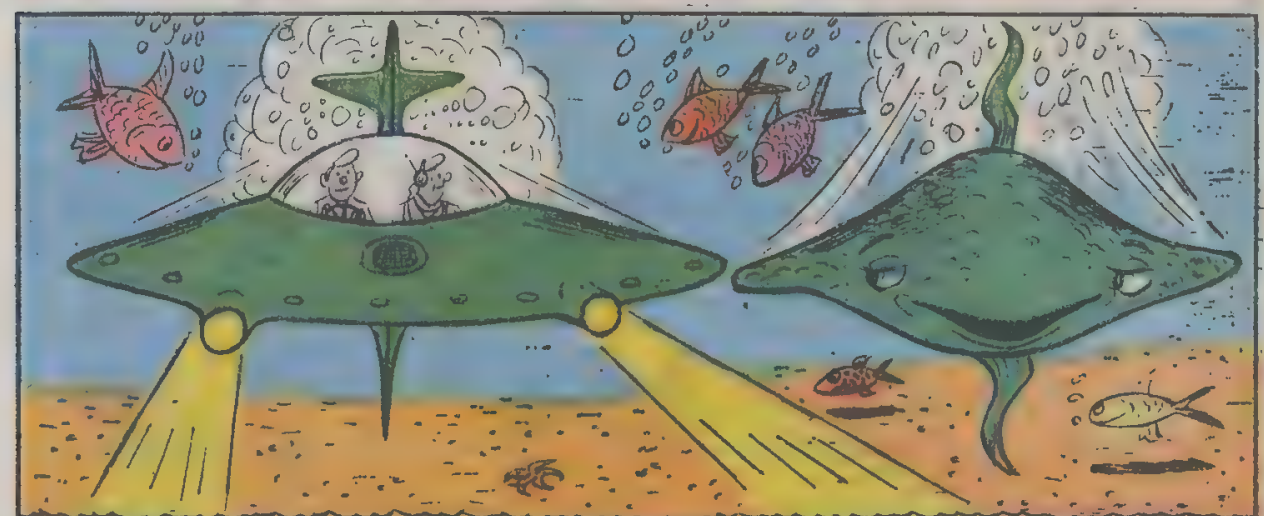
IN RECENT YEARS, RESEARCH HAS BEEN CONDUCTED BY A NEW KIND OF SCIENTIST. THEY ARE CALLED AQUANAUTS. THEY WORK FOR LONG PERIODS UNDER WATER IN WATERTIGHT ROOMS.



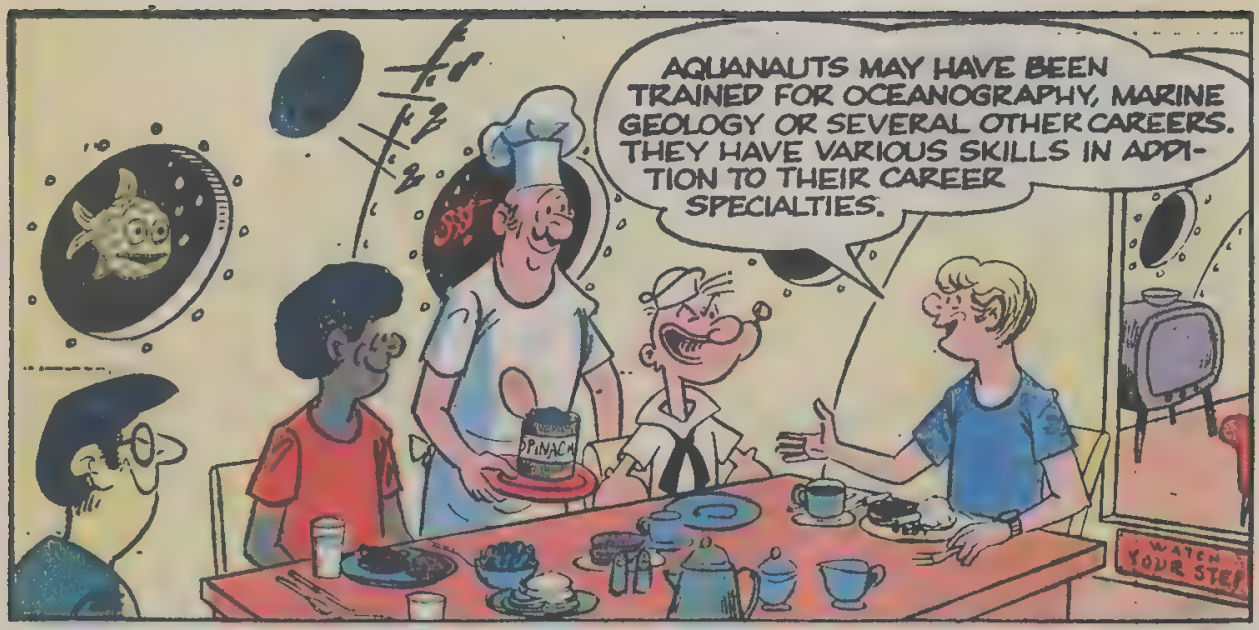
AQUANAUTS LIVE AND WORK FOR WEEKS AND EVEN MONTHS UNDER WATER TO DETERMINE ITS EFFECTS ON HUMANS FOR LONG PERIODS. IN THIS TOTALLY CONTROLLED ENVIRONMENT, HUMANS HAVE FUNCTIONED PERFECTLY. IT HAS BEEN USEFUL TO OUR SPACE PROGRAM BECAUSE THEY HAVE THE SAME LIVING PROBLEMS IN AN UNDERWATER HABITATION TO THOSE THAT OUR ASTRONAUTS FACE ON TRIPS TO THE MOON.

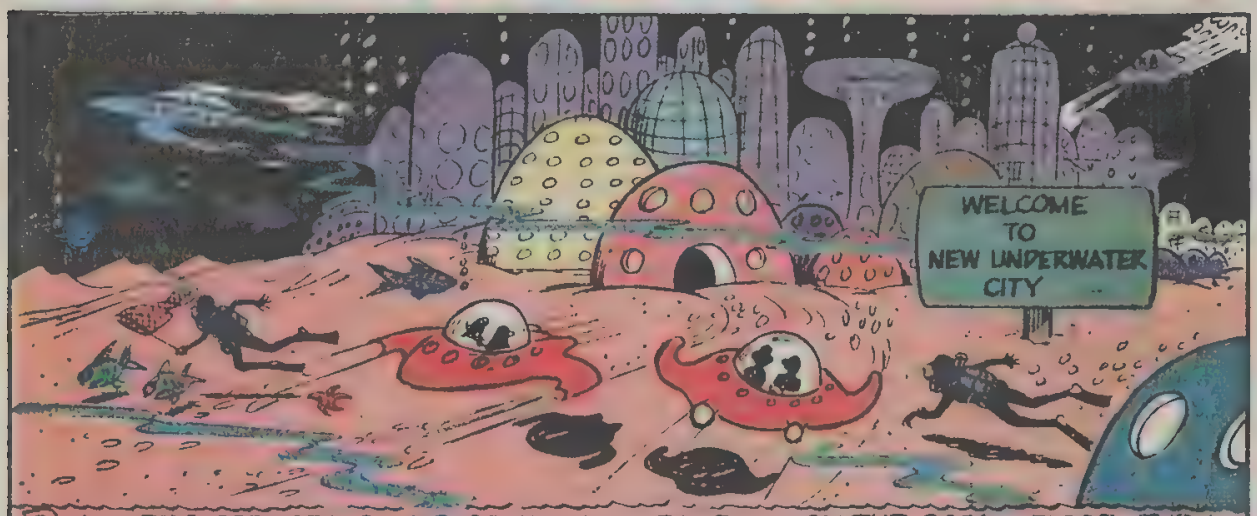


MARINE SCIENTISTS ARE CONTINUALLY DEVELOPING NEW EQUIPMENT FOR UNDERWATER EXPLORATION. AQUANAUTS LEAVE THE UNDERWATER "HOME" TO EXPLORE THE OCEAN FLOOR AROUND THEM.

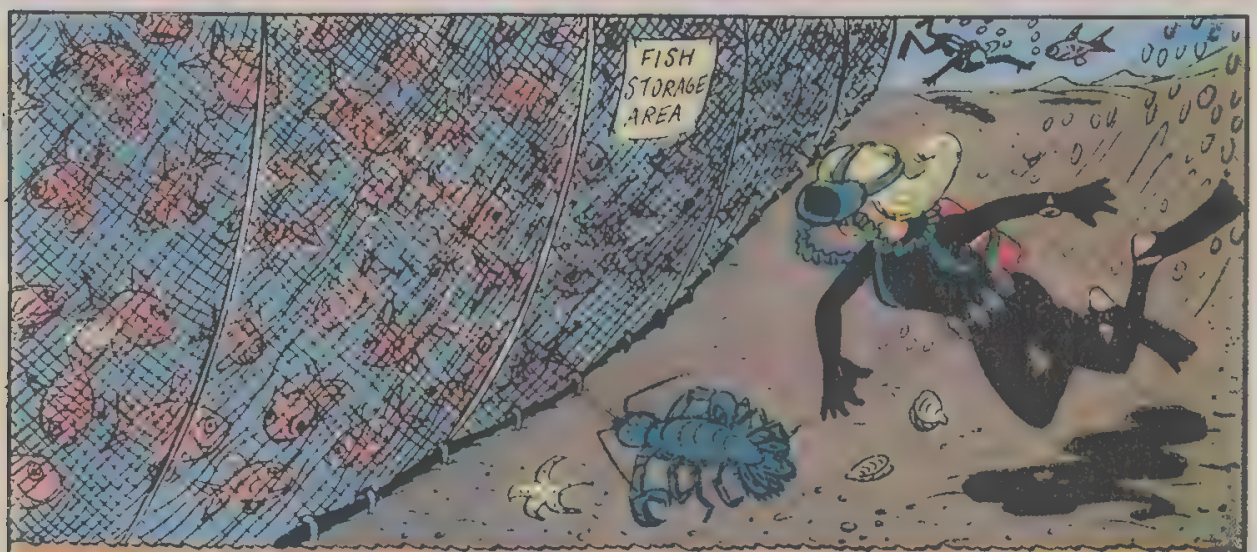


VARIOUS TYPES OF EXPLORATION CRAFT HAVE BEEN DEVELOPED FOR USE BY AQUANAUTS. EXCITING DISCOVERIES ARE BEING MADE EACH YEAR IN THIS FIELD. AS MORE DISCOVERIES ARE MADE, MORE MARINE SCIENTISTS ARE NEEDED.

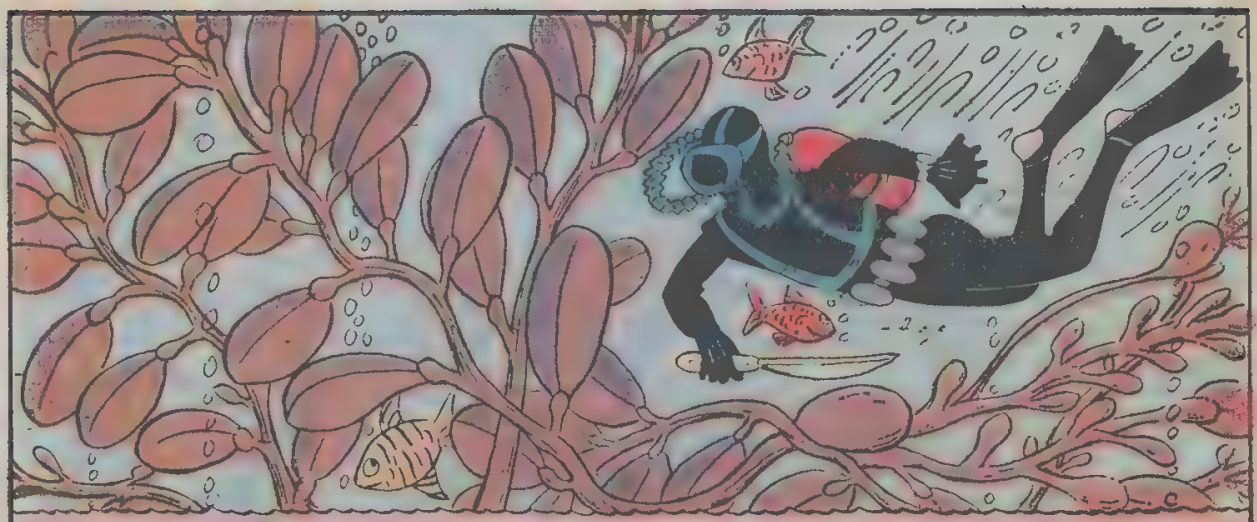




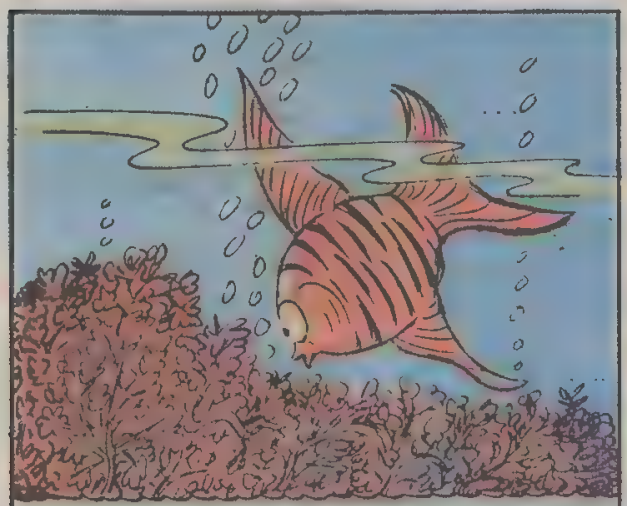
PLANNERS FORESEE CITIES OF THE FUTURE BUILT ON THE OCEAN FLOOR. THEY WILL BE SECURE FROM ATMOSPHERIC DISTURBANCES, PROTECTED FROM GREAT COLD AND HEAT, AND HAVE OTHER ADVANTAGES.



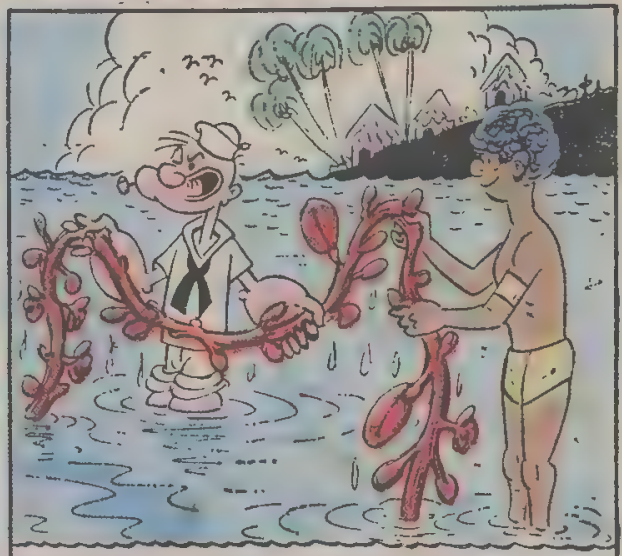
THEY PREDICT THAT FISH WILL BE ENCLOSED IN PROTECTED AREAS FROM WHICH THE FISH WILL BE HARVESTED AS NEEDED.



SEAWEED SOMETIMES GROWS STEMS AS LONG AS 200 FEET. MARINE SCIENTISTS FOUND THAT GIANT KELP CAN BE HARVESTED TO MAKE FERTILIZERS. DURING WARTIME IT WAS USED IN THE MANUFACTURE OF EXPLOSIVES.

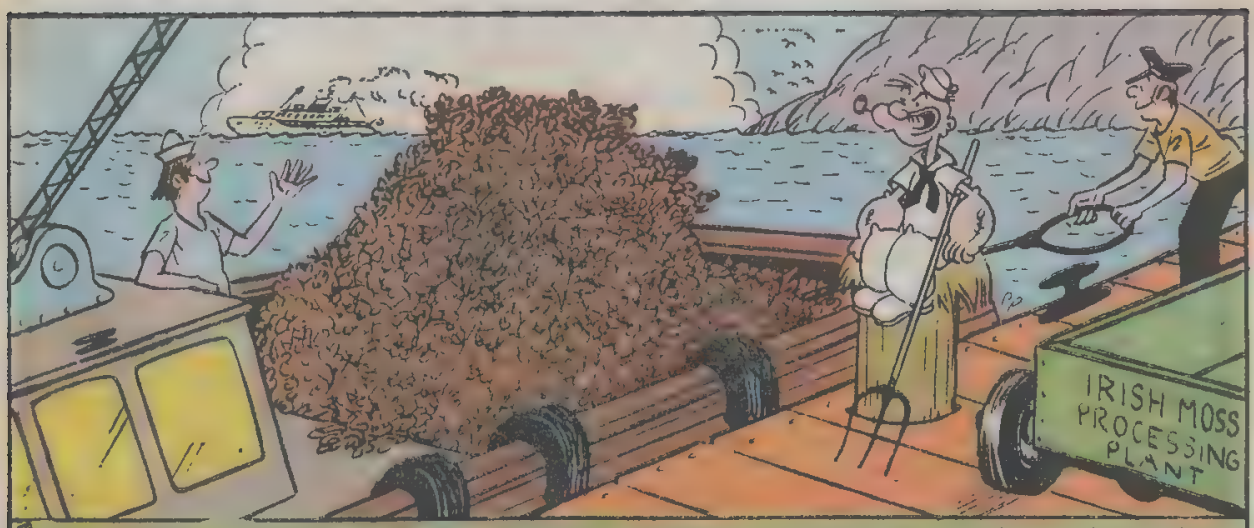


SCIENTISTS WHO STUDIED MARINE LIFE CULTIVATION FOUND THAT BROWN ALGAE-TYPE KELP GROWS IN COLDER WATER. IT MAY GROW TO A LENGTH OF 100 FEET.

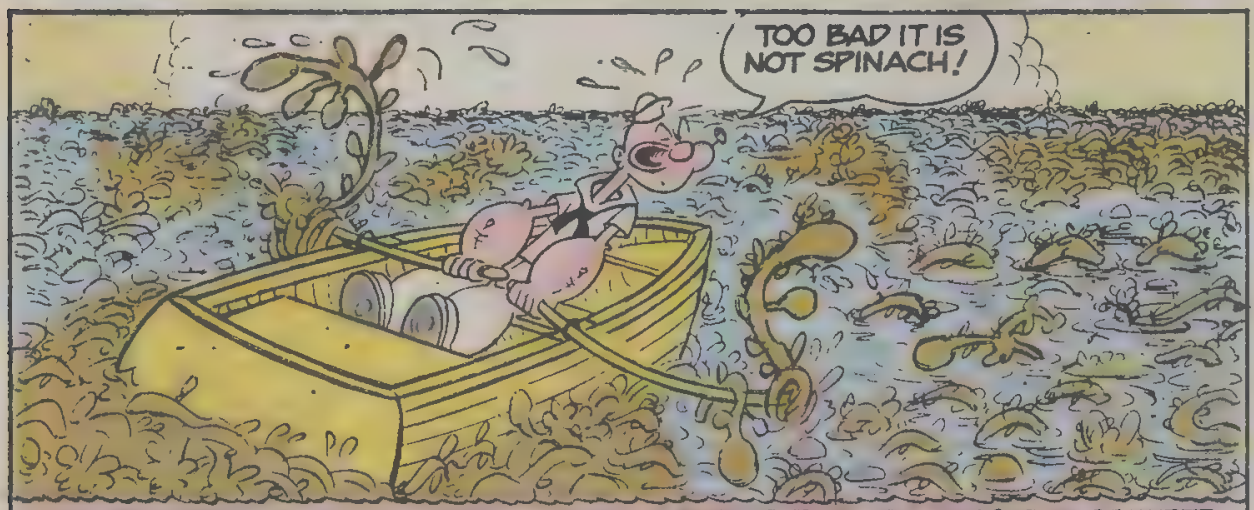


THEY FOUND THAT RED ALGAE GROWS IN WARMER WATERS.

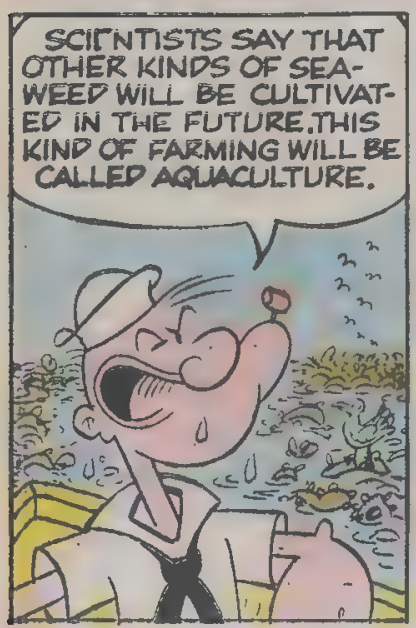
KELP IS RICH IN IODINE, AN IMPORTANT MINERAL. IT ALSO HAS A SUBSTANCE THAT HAS MANY COMMERCIAL USES. IT KEEPS ICE CREAM FROM GETTING ICY AND IS USED IN SALAD DRESSINGS, CHOCOLATE MILK AND ASPIRIN.

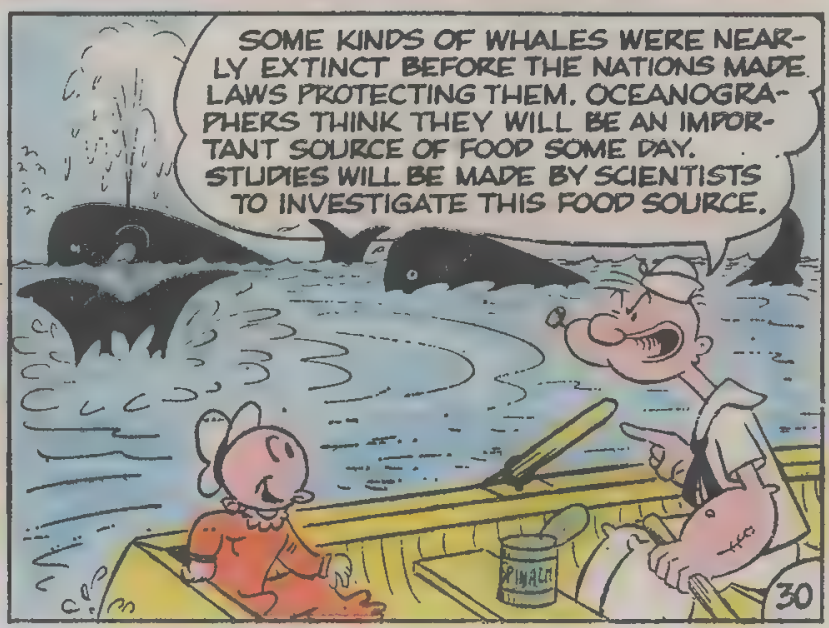


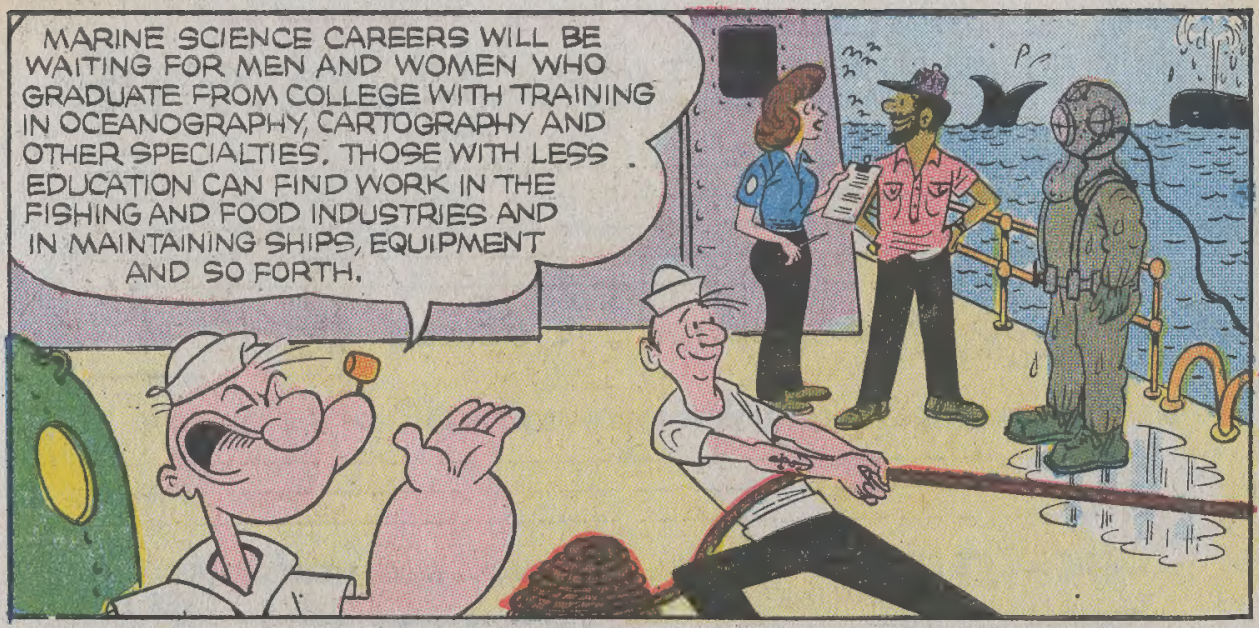
IRISH MOSS IS A RED ALGAE PLANT, DARK BROWN OR PURPLISH IN COLOR, AND FAN-SHAPED. WHEN IT IS GATHERED UP, THE MOSS IS BLEACHED OF ITS DARK COLOR, SOLD COMMERCIALLY, AND EATEN AS A FOOD BY MANY PEOPLE.

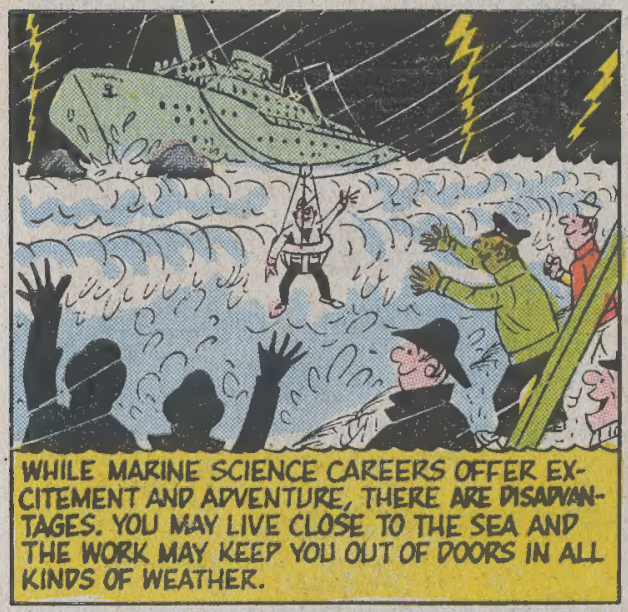


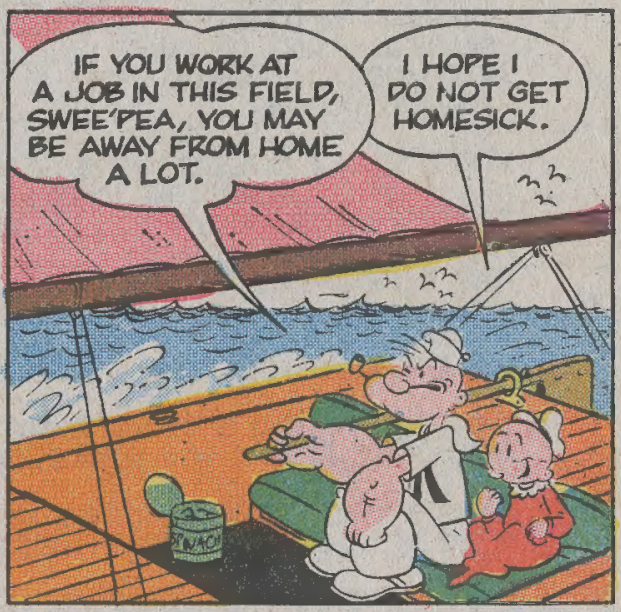
WHEN COLUMBUS SAILED TO AMERICA, HIS SHIPS PASSED THROUGH MASSES OF SEAWEED. THESE WERE BROWN ALGAE KNOWN AS GULFWEED. THIS HUGE MASS OF SEAWEED IS FLOATING IN THE ATLANTIC EAST OF FLORIDA. IT IS CALLED THE SARGASSO SEA.






MARINE SCIENCE CAREERS WILL BE WAITING FOR MEN AND WOMEN WHO GRADUATE FROM COLLEGE WITH TRAINING IN OCEANOGRAPHY, CARTOGRAPHY AND OTHER SPECIALTIES. THOSE WITH LESS EDUCATION CAN FIND WORK IN THE FISHING AND FOOD INDUSTRIES AND IN MAINTAINING SHIPS, EQUIPMENT AND SO FORTH.


WHILE MARINE SCIENCE CAREERS OFFER EXCITEMENT AND ADVENTURE, THERE ARE DISADVANTAGES. YOU MAY LIVE CLOSE TO THE SEA AND THE WORK MAY KEEP YOU OUT OF DOORS IN ALL KINDS OF WEATHER.


IF YOU WORK AT A JOB IN THIS FIELD, SWEE'PEA, YOU MAY BE AWAY FROM HOME A LOT.
I HOPE I DO NOT GET HOMESICK.


THE LESSON FOR TODAY IS IN OCEANOGRAPHY, SWEE'PEA!
YIPPEE!
THE END.

CAN YOU ANSWER THESE?

1. LIST FIVE JOBS IN MARINE SCIENCE CAREERS YOU MIGHT ENJOY. NEXT TO EACH JOB LIST THE TRAINING YOU WOULD NEED. YOU CAN FIND THE ANSWERS IN THIS BOOK.

JOB	TRAINING

2. DID YOU FIND ANY JOBS YOU DID NOT KNOW ABOUT? CHECK ONE YES ____ NO ____

3. LIST SIX MARINE SCIENCE JOBS YOU DID NOT KNOW ABOUT BEFORE YOU READ THIS BOOK:

4. MARINE SCIENCE CAREERS ARE POSSIBLE WITH TRAINING WHICH MIGHT INCLUDE:

CHECK ONE	YES	NO		YES	NO
ON-THE-JOB TRAINING			JUNIOR COLLEGE		
HIGH SCHOOL DIPLOMA			4 YEAR COLLEGE DEGREE		
VOCATIONAL SCHOOL DIPLOMA			GRADUATE DEGREE		
APPRENTICESHIP TRAINING			LABORATORY SKILLS		
TECHNICAL TRAINING			NAVIGATION		

5. MARINE SCIENCE CAREERS MAY BE FOUND IN:

CHECK ONE	YES	NO		YES	NO
RESEARCH & DEVELOPMENT			COLLEGES & UNIVERSITIES		
FISHING INDUSTRIES			MARINE LABORATORIES		
FOOD PROCESSING PLANTS			OIL COMPANIES		
INDUSTRY			UNDERWATER CONSTRUCTION & SALVAGE		
ARMED SERVICES			TECHNICAL WRITING		
GOVERNMENT AGENCIES			WEATHER & SPACE RESEARCH		

6. THERE WILL BE MANY OPPORTUNITIES FOR MEN AND WOMEN WITH A WIDE RANGE OF ABILITIES IN MARINE SCIENCE JOBS: YES ____ NO ____

7. PEOPLE WHO WORK IN MARINE SCIENCE JOBS MAY WORK ON SHORE, ON BOATS, IN THE WATER, UNDER WATER OR IN THE AIR: ____ ____

8. LIFE SCIENTISTS ARE CONCERNED WITH MEN, MICROBES, PLANTS, FISH, ANIMALS AND HEALTH AND DISEASE ON LAND AND SEA: ____ ____

9. MARINE SCIENTISTS WILL BE SEEKING NEW TECHNIQUES TO DEVELOP FRESH WATER AND MORE FOOD. ____ ____

10. IN MANY CASES, MARINE SCIENTISTS ARE AWAY FROM HOME FOR LONG PERIODS OF TIME: ____ ____

11. MARINE SCIENCE CAREERS ARE VERY IMPORTANT TO THE ECOLOGY OF THE WORLD: ____ ____

12. POPEYE SAID A LOT OF SCHOOLING WAS NECESSARY FOR MANY OF THE MARINE SCIENCE JOBS: ____ ____

HEY, KIDS-

DISCUSSION QUESTIONS!

DIRECTIONS:

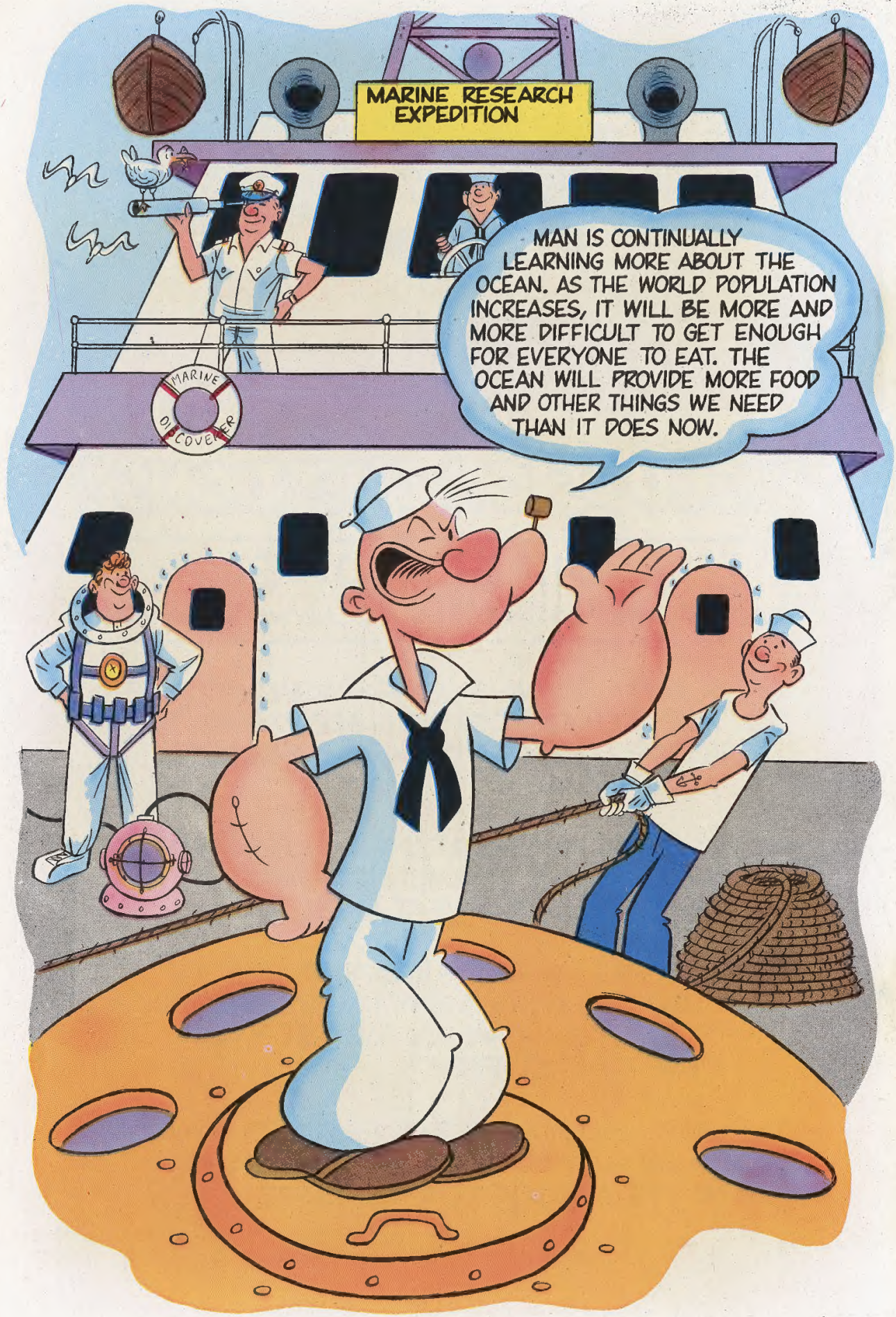
CONSIDER AND DISCUSS THE FOLLOWING QUESTIONS

1. IN HOW MANY WAYS DOES THE OCEAN INFLUENCE YOUR LIFE? CONSIDER THE PLACE YOU LIVE, THE WEATHER, THE FOOD YOU EAT, THE PRODUCTS YOU CONSUME.

2. WHAT HAS BEEN YOUR EXPERIENCE REGARDING THE OCEAN? WHAT DO YOU KNOW ABOUT IT? WHAT WOULD YOU LIKE TO KNOW?

3. WHAT HAS BEEN MAN'S RELATIONSHIP TO THE OCEAN THROUGH HISTORY? WHAT LITERATURE OF THE OCEAN HAVE YOU ENJOYED? WHAT FILMS HAVE YOU SEEN?

4. WHAT NEW CAREERS THAT RELATE TO WORK IN, ON, OR ABOVE THE OCEAN, OR ON THE LAND NEAR IT WOULD YOU CHOOSE TO DO?


MARINE RESEARCH EXPEDITION
MARINE
MAN IS CONTINUALLY LEARNING MORE ABOUT THE OCEAN. AS THE WORLD POPULATION INCREASES, IT WILL BE MORE AND MORE DIFFICULT TO GET ENOUGH FOR EVERYONE TO EAT. THE OCEAN WILL PROVIDE MORE FOOD AND OTHER THINGS WE NEED THAN IT DOES NOW.